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**THE GRADUATE
SCHOOL**



ANNOUNCEMENTS

1938 - 1939

COLLEGE PARK, MARYLAND

THE UNIVERSITY
of
MARYLAND

THE GRADUATE SCHOOL
ANNOUNCEMENTS
FOR THE SESSIONS OF
1938 - 1939



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CALENDAR

1938-1939

1938

First Semester

Sept. 17	Saturday	Registration.
Sept. 19	Monday. 8:20 a. m.	Instruction for first semester begins.
Oct. 5	Wednesday	Modern language examinations for Ph. D. requirement. Last day to file applications for admission to candidacy for Doctor's degree at Commencement of 1939.
Oct. 6	Thursday	Late registration fee effective.
Nov. 23-28	Wednesday, 4:10 p. m. Monday. 8:20 a. m.	Thanksgiving recess.
Dec. 16	Friday. 4:10 p. m.	Christmas recess begins.
1939		
Jan. 3	Tuesday. 8:20 a. m.	Christmas recess ends.
Jan. 18-26	Wednesday-Thursday	First semester examinations.

Second Semester

Jan. 24-31	Tuesday-Tuesday	Registration for second semester.
Feb. 1	Wednesday. 8:20 a. m.	Instruction for second semester begins. Last day to file applications for admission to candidacy for the Master's degree at Commencement of 1939.
Feb. 1	Wednesday	Modern language examinations for Ph. D. requirement.
Feb. 6	Monday	Late registration fee effective.
Feb. 22	Wednesday	Washington's Birthday. Holiday.
March 25	Saturday	Maryland Day.
April 6-11	Thursday. 4:10 p. m. Tuesday. 8:20 a. m.	Easter recess.
May 13	Saturday	Last day to deposit Doctor's thesis in office of Graduate School.
May 20	Saturday	Last day to deposit Master's thesis in office of Graduate School.
May 22-31	Monday-Wednesday	Second semester examinations.
May 28	Sunday. 11:00 a. m.	Baccalaureate sermon.
May 30	Tuesday	Memorial Day. Holiday.
June 2	Friday	Class Day.
June 3	Saturday	Commencement.
June 7	Wednesday	Modern language examinations for Ph. D. requirement.

Summer Term

June 26	Monday	Summer session begins.
Aug. 4	Friday	Summer session ends.

BOARD OF REGENTS

Term Expires

W. W. SKINNER, Chairman.....	1945
Kensington, Montgomery County	
MRS. JOHN L. WHITEHURST, Secretary.....	1938
4101 Greenway, Baltimore	
W. CALVIN CHESNUT.....	1942
Roland Park, Baltimore	
WILLIAM P. COLE, JR.....	1940
Towson, Baltimore County	
HENRY HOLZAPFEL, JR.....	1943
Hagerstown, Washington County	
HARRY H. NUTTLE.....	1941
Denton, Caroline County	
J. MILTON PATTERSON.....	1944
1015 Argonne Drive, Northwood, Baltimore	
JOHN E. RAINE.....	1939
Towson, Baltimore County	
CLINTON L. RIGGS.....	1942
903 North Charles Street, Baltimore	

ADMINISTRATIVE OFFICERS

H. C. BYRD, LL.D., President of the University.
C. O. APPLEMAN, Ph.D., Dean of the Graduate School.
ELSIE PARRETT, M. A., Secretary to the Dean.
W. S. SMALL, Ph.D., Director of the Summer School.
ADELE STAMP, M. A., Dean of Women.
H. T. CASBARIAN, B. C. S., C. P. A., Comptroller.
W. M. HILLEGEIST, Director of Admissions.
ALMA H. PREINKERT, M. A., Registrar.
CARL W. E. HINTZ, A. M. L. S., Librarian.
H. L. CRISP, M. M. E. Superintendent of Buildings and Grounds.
T. A. HUTTON, B. A., Purchasing Agent and Manager of Students' Supply Store.

THE GRADUATE SCHOOL COUNCIL

H. C. BYRD, LL.D., President of the University.
C. O. APPLEMAN, Ph.D., Dean of the Graduate School, Chairman.
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H. F. COTTERMAN, Ph.D., Professor of Agricultural Education.
WILLIAM H. FALLS, Ph.D., Professor of French.
H. C. HOUSE, Ph.D., Professor of English Language and Literature.
L. V. HOWARD, Ph.D., Professor of Political Science.
L. H. JAMES, Ph.D., Professor of Bacteriology.
DEVÖE MEADE, Ph.D., Professor of Animal and Dairy Husbandry.
J. E. METZGER, M. A., Professor of Agronomy.
M. MARIE MOUNT, M. A., Professor of Home and Institution Management.
H. J. PATTERSON, D.Sc., Dean Emeritus of Agriculture.
W. S. SMALL, Ph.D., Professor of Education.
T. H. TALIAFERRO, C. E., Ph.D., Dean of the Faculty.
MARVIN R. THOMPSON, Ph.C., Ph.D., Emerson Professor of Pharmacology (Baltimore).
EDUARD UILENHUTH, Ph.D., Professor of Gross Anatomy (Baltimore).

GENERAL INFORMATION

HISTORY AND ORGANIZATION

In the earlier years of the institution the Master's degree was frequently conferred, but the work of the graduate students was in charge of the departments concerned, under the supervision of the general faculty. The Graduate School of the University of Maryland was established in 1918, and organized graduate instruction leading to both the Master's and the Doctor's degree was undertaken. The faculty of the Graduate School includes all members of the various faculties who give instruction in approved graduate courses. The general administrative functions of the graduate faculty are delegated to a Graduate Council, of which the Dean of the Graduate School is chairman.

LOCATION

The University of Maryland is located at College Park, in Prince George's County, Maryland, on the Baltimore and Ohio Railroad, eight miles from Washington and thirty-two miles from Baltimore. Washington, with its wealth of resources, is easily accessible by train, street car and bus.

The professional schools of Medicine, Nursing, Pharmacy, Dentistry and Law are located in Baltimore, at the corner of Lombard and Greene Streets.

LIBRARIES

In addition to the resources of the University library, the great libraries of the National Capital are easily available for reference work. Because of the proximity of these libraries to College Park they are a valuable asset to research and graduate work at the University of Maryland.

The library building at College Park contains a number of seminar rooms and other desirable facilities for graduate work.

GENERAL REGULATIONS

ADMISSION

Graduates from recognized colleges regarded as standard by the institution and by regional or general accrediting agencies are admitted to the Graduate School. The applicant shall present an official transcript of his collegiate record which for unconditional admission shall show creditable completion of an undergraduate major in the subject chosen for specialization in the Graduate School.

Application blanks for admission to the Graduate School are obtained from the office of the Dean. After approval of the application, a matriculation card, signed by the Dean, is issued to the student. This card per-

mits one to register in the Graduate School. After payment of the fee, the matriculation card is stamped and returned. It is the student's certificate of membership in the Graduate School, and may be called for at any succeeding registration.

Admission to the Graduate School does not necessarily imply admission to candidacy for an advanced degree.

REGISTRATION

All students pursuing graduate work in the University, even though they are not candidates for higher degrees, are required to register in the Graduate School at the beginning of each semester. Students taking graduate work in the summer session are also required to register in the Graduate School at the beginning of each session. In no case will graduate credit be given unless the student matriculates and registers in the Graduate School. Registration for the first semester is held in the Gymnasium-Armory on the date designated in the calendar. Students register for the second semester and for the summer session in the office of the Dean, T-214, Agriculture Building. A late registration fee will be charged to graduate students who register after October 5 and February 5. The program of work for the semester or the summer session is arranged by the student with the major department and entered upon two course cards, which are signed first by the professor in charge of the student's major subject and then by the Dean of the Graduate School. One card is retained by the Dean. The student takes the other card, and in case of a new student, also the matriculation card, to the Registrar's office, where the registration is completed. Students will not be admitted to graduate courses until the Registrar has certified to the instructor that registration has been completed. Course cards may be obtained at the Registrar's office or at the Dean's office. The heads of departments usually keep a supply of these cards in their respective offices.

GRADUATE COURSES

Graduate students must elect for credit in partial fulfillment of the requirements for higher degrees only courses designated *For Graduates* or *For Graduates and Advanced Undergraduates*. Graduate students may elect courses numbered from 1 to 99 in the general catalogue but graduate credit will not be allowed for these. Students with inadequate preparation may be obliged to take some of these courses as prerequisites for advanced courses. No credit toward graduate degrees may be obtained by correspondence or extension study.

PROGRAM OF WORK

The professor who is selected to direct a student's thesis work is the student's adviser in the formulation of a graduate program, including suitable minor work, which is arranged in cooperation with the instructors. To encourage thoroughness in scholarship through intensive application, graduate students in the regular sessions are limited to a program of thirty credit hours for the year, including thesis work, which is valued at not less than six hours.

SUMMER GRADUATE WORK

Graduate work in the summer session may be counted as residence toward an advanced degree. By carrying approximately six semester hours of graduate work for four summer sessions at this institution, a student may fulfill the residence requirements for the master's degree, provided that the greater part of the thesis work can be done under direction during the periods between summer sessions. In some instances a fifth summer of residence may be required in order that a satisfactory thesis may be completed.

By special arrangement, graduate work may be pursued during the entire summer in some departments. Such students as graduate assistants, or others who may wish to supplement work done during the regular year, may satisfy one-third of an academic year's residence by full-time graduate work for eleven or twelve weeks, provided satisfactory supervision and facilities for summer work are available in their special fields.

The University publishes a special bulletin giving full information concerning the summer session and the graduate courses offered therein. The bulletin is available upon application to the Registrar of the University.

GRADUATE WORK IN PROFESSIONAL SCHOOLS AT BALTIMORE

Graduate courses and opportunities for research are offered in some of the professional schools at Baltimore. Students pursuing graduate work in the professional schools must register in the Graduate School, and meet the same requirements and proceed in the same way as do graduate students in other departments of the University.

The graduate courses in the professional schools are listed on pages 80-86.

GRADUATE WORK BY SENIORS IN THIS UNIVERSITY

Seniors who have completed all their undergraduate courses in this University by the end of the first semester, and who continue their residence in the University for the remainder of the year, are permitted to register in the Graduate School and secure the privileges of its membership, even though the bachelor's degree is not conferred until the close of the year.

A senior of this University who has nearly completed the requirements for the undergraduate degree may, with the approval of his undergraduate Dean and the Dean of the Graduate School, register in the undergraduate college for graduate courses, which may be transferred for graduate credit toward an advanced degree at this University, but the total of undergraduate and graduate courses must not exceed fifteen credits for the semester. Graduate credits earned during the senior year may not be used to shorten the residence period required for advanced degrees.

ADMISSION TO CANDIDACY FOR ADVANCED DEGREES

Application for admission to candidacy for the Master's and for the Doctor's degree is made on application blanks which are obtained at the

office of the Dean of the Graduate School. These are filled out in duplicate and after the required endorsements are obtained, the applications are acted upon by the Graduate Council. An official transcript of the candidate's undergraduate record and any graduate courses completed at other institutions must be filed in the Dean's office before the application can be considered.

Admission to candidacy in no case assures the student of a degree, but merely signifies he has met all the formal requirements and is considered by his instructors sufficiently prepared and able to pursue such graduate study and research as are demanded by the requirements of the degree sought. The candidate must show superior scholarship by the type of graduate work already completed.

Application for admission to candidacy is made at the time stated in the sections dealing with the requirements for the degree sought.

REQUIREMENTS FOR THE DEGREES OF MASTER OF ARTS AND MASTER OF SCIENCE

Advancement to Candidacy. Each candidate for the Master's degree is required to make application for admission to candidacy not later than the date when instruction begins for the second semester of the academic year in which the degree is sought, but not until at least twelve semester course hours of graduate work have been completed. An average grade of "B" in all major and minor subjects is required.

Minimum Residence. A residence of at least one full academic year, or its equivalent, at this institution, is required.

Course Requirements. A minimum of twenty-four semester hours with an average "B" grade in courses approved for graduate credit is required for the Master's degree. If the student is inadequately prepared for the required graduate courses, either in the major or minor subjects, additional courses may be required to supplement the undergraduate work. Of the twenty-four hours required in graduate courses, not less than twelve semester hours and not more than sixteen semester hours must be earned in a major subject. The remaining credits must be outside the major subject and must comprise a group of coherent courses intended to supplement and support the major work. Not less than one-half of the total required course credits for the Master's degree, or a minimum of twelve, must be selected from courses numbered 200 or above. The entire course of study must constitute a unified program approved by the student's major adviser and by the Dean of the Graduate School.

Transfer of Credit. Credit, not to exceed six hours, obtained at other recognized institutions may be transferred and applied to the course requirements of the Master's degree, provided that the work was of graduate character, and provided that acceptance of the transferred credit does not reduce the minimum residence period of one academic year. The candidate is, however, subject to final examination by this institution in all work offered for the degree.

Thesis. In addition to the twenty-four semester hours in graduate courses a satisfactory thesis is required of all candidates for the Master's degree. It must demonstrate the student's ability to do independent work and it must be acceptable in literary style and composition. It is assumed that the time devoted to thesis work will be not less than the equivalent of six semester hours earned in graduate courses. With the approval of the student's major professor and the Dean of the Graduate School, the thesis in certain cases may be prepared *in absentia* under direction and supervision of a member of the faculty of this institution.

The original copy of the thesis must be deposited in the office of the Graduate School not later than two weeks before commencement. An abstract of the contents of the thesis, 200 to 250 words in length, must accompany it. A manual giving full directions for the physical make-up of the thesis is in the hands of each professor who directs thesis work, and should be consulted by the student before the typing of the manuscript is begun. Individual copies of this manual may be obtained by the student at the Dean's office at nominal cost.

Final Examination. The final oral examination is conducted by a committee appointed by the Dean of the Graduate School. The student's adviser acts as the chairman of the committee. The other members of the committee are persons under whom the student has taken most of his major and minor courses. The chairman and the candidate are notified of the personnel of the examining committee at least one week prior to the period set for oral examinations. The chairman of the committee selects the exact time and place for the examination and notifies the other members of the committee and the candidate. The examination should be conducted within the dates specified and a report of the committee sent to the Dean as soon as possible after the examination. A special form for this purpose is supplied to the chairman of the committee. Such a report is the basis upon which recommendation is made to the faculty that the candidate be granted the degree sought. The period for the oral examination is usually one hour.

The examining committee also approves the thesis, and it is the candidate's obligation to see that each member of the committee has ample opportunity to examine a copy of the thesis prior to the date of the examination.

A student will not be admitted to final examination until all other requirements for the degree have been met.

REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

Advancement to Candidacy. Candidates for the Doctor's degree must be admitted to candidacy not later than one academic year prior to the granting of the degree. Applications for admission to candidacy for the Doctor's degree must be deposited in the office of the Dean not later than the first Wednesday in October of the academic year in which the degree is sought.

The applicant must have obtained from the head of the Modern Language Department a statement that he possesses a reading knowledge of French and German. Preliminary examinations or such other sub-

stantial tests as the departments may elect are also required for admission to candidacy.

Residence. Three years of full-time resident graduate study are required. The first two of the three years may be spent in other institutions offering standard graduate work. On a part-time basis the time needed will be correspondingly increased. The degree is not given merely as a certificate of residence and work, but is granted only upon sufficient evidence of high attainments in scholarship, and ability to carry on independent research in the special field in which the major work is done.

Major and Minor Subjects. The candidate must select a major and one or two closely related minor subjects. The minor work required varies from twenty-four to thirty hours at the discretion of the department concerned. The remainder of the required residence is devoted to intensive study and research in the major field. The amount of required course work in the major subject will vary with the department and the individual candidate.

Thesis. The ability to do independent research must be shown by a dissertation on some topic connected with the major subject. The original typewritten copy and one clear carbon copy of the thesis, together with an abstract of the contents, 200 to 250 words in length, must be deposited in the office of the Dean at least three weeks before commencement. One or two extra copies of the thesis should be provided for use of members of the examining committee prior to the date of the final examination. The thesis is later printed in such form as the committee and the Dean may approve, and fifty copies are deposited in the University library.

A manual giving full directions for the physical make-up of the thesis is in the hands of each professor who directs thesis work, and should be consulted by the student before typing of the thesis is begun. Students may obtain copies of this manual at the Dean's office, at nominal cost.

Final Examination. The final oral examination is held before a committee appointed by the Dean. One member of this committee is a representative of the graduate faculty who is not directly concerned with the student's graduate work. One or more members of the committee may be persons from other institutions who are distinguished scholars in the student's major field.

The duration of the examination is approximately three hours, and covers the research work of the candidate as embodied in his thesis, and his attainments in the fields of his major and minor subjects. The other detailed procedures are the same as those stated for the Master's examination.

RULES GOVERNING LANGUAGE EXAMINATIONS FOR CANDIDATES FOR THE DEGREE OF DOCTOR OF PHILOSOPHY.

1. A candidate for the Doctor's degree must show in a written examination that he possesses a reading knowledge of French and German. The

passages to be translated will be taken from books and articles in his specialized field. Some 500 pages of text from which the applicant wishes to have his examination chosen should be submitted to the head of the Department of Modern Languages at least three days before the examination. It is not expected that the candidate recognize every word of the text but it is presumed that he will know sufficient grammar to distinguish inflectional forms and that he will have a large enough vocabulary to give a good translation without the aid of a dictionary.

2. Application for admission to these tests must be filed in the office of the Department of Modern Languages at least three days in advance of the tests.

3. No penalty is attached to failure in the examination, and the unsuccessful candidate is free to try again at the next date set for these tests.

4. Examinations are held in the office of the Department of Modern Languages, Arts and Sciences building, on the first Wednesdays in February, June, and October, at 2 p. m.

GRADUATE FEES

The fees paid by graduate students are as follows:

A matriculation fee of \$10.00. This is paid once only, upon admission to the Graduate School.

A fixed charge, each semester, at the rate of \$4.00 per semester credit hour.

A diploma fee (Master's degree), \$10.00.

A graduation fee, including hood (Doctor's degree), \$20.00.

FELLOWSHIPS AND ASSISTANTSHIPS

Fellowships. A number of fellowships have been established by the University. A few industrial fellowships are also available in certain departments. The stipend for the University fellows is \$400 for the academic year and the remission of all graduate fees except the diploma fee.

Application blanks for University fellowships may be obtained from the office of the Graduate School. The application, with the necessary credentials, is sent by the applicant directly to the Dean of the Graduate School.

Fellows are required to render minor services prescribed by their major departments. The usual amount of service required does not exceed twelve clock hours per week. Fellows are permitted to carry a full graduate program, and they may satisfy the residence requirement for higher degrees in the normal time.

The selection of fellows is made by the departments to which the fellowships are assigned, with the approval of the dean or director concerned, but all applications must first be approved by the Dean of the Graduate School. The awards of University fellowships are on a competitive basis.

Graduate Assistantships. A number of teaching and research graduate assistantships are available in several departments. The compensation for these assistantships is \$800 a year and the remission of all graduate fees except the diploma fee. Graduate assistants are appointed for one year and they are eligible to reappointment. The assistant in this class devotes one-half of his time to instruction or to research in connection with Experiment Station projects, and he is required to spend two years in residence for the Master's degree. If he continues in residence for the Doctor's degree, he is allowed two-thirds residence credit for each academic year at this University. The minimum residence requirement from the Bachelor's degree, therefore, may be satisfied in four academic years and one summer, or three academic years and three summer sessions of eleven or twelve weeks each.

Other Assistants. Assistants not in the regular \$800 class are frequently allowed to take graduate courses if they are eligible for admission to the Graduate School. The stipend for these assistants varies with the services rendered, and it may or may not include the remission of graduate fees. The question of fees is decided in each individual case by the dean or director concerned when the stipend is arranged. The amount of graduate work these assistants are permitted to carry is determined by the head of the department, with the approval of the dean or director concerned. The Graduate Council, guided by the recommendation of the student's advisory committee, prescribes the required residence in each individual case at the time the student is admitted to candidacy.

Further information regarding assistantships may be obtained from the department or college concerned.

COMMENCEMENT

Attendance is required at the commencement at which the degree is conferred, unless the candidate is excused by the Dean of the Faculty.

Application for diploma must be filed in the office of the Registrar before March 1 of the year in which the candidate expects to obtain a degree.

Academic costume is required of all candidates at commencement. Candidates who so desire may purchase or rent caps and gowns at the Students' Supply Store. Order must be filed before March 20, but may be cancelled later if the student finds himself unable to complete his work for the degree.

DESCRIPTION OF COURSES

For the convenience of students in making out schedules of studies, the subjects in the following Description of Courses are arranged alphabetically:

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For convenience in identification, Courses for Graduates and Advanced Undergraduates are numbered 100 to 199; Courses for Graduates are numbered 200 and upward.

The letter following the number of the course indicates the semester in which the course is offered: Thus, 100f is offered the first semester; 101s, the second semester; 102y, the year.

The number of semester hours' credit is shown by the arabic numeral in parentheses after the title of the course. In year courses the number shown is the total for both semesters.

A separate schedule of courses is issued each semester, giving the hours, places of meeting, and other information required by the student in making out his schedule. Students will obtain these schedules when they register.

AGRICULTURAL ECONOMICS AND FARM MANAGEMENT

Courses for Graduates and Advanced Undergraduates

A. E. 100 f. *Agricultural Economics* (3)—Three lectures. Prerequisite, Econ. 5 f or s.

A general course in agricultural economics, with special reference to population trend, cultural wealth, land tenure, farm labor, agricultural credit, the tariff, price movements, and marketing. (DeVault.)

A. E. 101 s. *Transportation of Farm Products* (3)—Two lectures; one laboratory.

A study of the development of transportation in the United States and facilities for transporting farm products, with special attention to such problems as tariffs, rate structure, and the development of fast freight lines, refrigerator service, truck transportation of agricultural products; observation of transportation agencies in action. (Coddington.)

A. E. 102 s. *Marketing of Farm Products* (3)—Three lectures. Prerequisite, Econ. 5 f or s.

A complete analysis of the present system of transporting, storing, and distributing farm products, and a basis for intelligent direction of effort in increasing the efficiency of marketing methods. (DeVault.)

A. E. 103 f. *Co-operation in Agriculture* (3)—Three lectures.

Historical and comparative development of farmers' co-operative organizations with some reference to farmer movements; reasons for failure, and essentials to success; commodity developments; the Federal Farm Board; banks for co-operatives; present trends. (Coddington.)

A. E. 104 s. *Agricultural Finance* (3)—Three lectures.

Agricultural Credit requirements; development and volume of business of institutions financing agriculture; financing specific farm organizations and industries. Farm Insurance—fire, crop, livestock, and life insurance, with especial reference to mutual developments—how provided, benefits, and needed extension. (Coddington.)

A. E. 105 s. *Food Products Inspection* (3)—Two lectures; one laboratory.

This course, arranged by the Department of Agricultural Economics in co-operation with the State Department of Markets and the United States Department of Agriculture, is designed to give the students primary instruction in the grading, standardizing and inspection of fruits and vegetables, dairy products, poultry products, meats, and other food products. Theoretical instruction covering the fundamental principles will be given in the form of lectures, while the demonstrational and practical work will be conducted through laboratories and field trips to Washington, D. C., and Baltimore. (Staff.)

A. E. 106 s. *Prices* (3)—Two lectures; one laboratory.

A general course in prices, price relationships, and price analysis, with emphasis on prices of agricultural products. (Ives.)

A. E. 107 s. *Analysis of the Farm Business* (3)—One lecture; two laboratories.

A concise, practical course in the keeping, summarizing, and analyzing of farm accounts. (Hamilton.)

A. E. 108 f. *Farm Management* (3)—Three lectures.

A study of the organization and operation of Maryland farms from the standpoint of efficiency and profits. Students will be expected to make an analysis of the actual farm business and practices of different types of farms located in various parts of the state, and to make specific recommendations as to how these farms may be organized and operated as successful businesses. (Hamilton.)

A. E. 109 y. *Research Problems* (1-3).

With the permission of the instructor, students will work on any research problems in agricultural economics which they may choose, or a special list of subjects will be made up from which the students may select their research problems. There will be occasional class meetings for the purpose of making reports on progress of work, methods of approach, etc. (DeVault.)

Courses for Graduates

A. E. 201 y. *Special Problems in Agricultural Economics* (3).

An advanced course dealing more extensively with some of the economic problems affecting the farmer, such as land problems, agricultural finance, farm wealth, agricultural prices, transportation, and special problems in marketing and co-operation. (DeVault.)

A. E. 202 y. *Seminar* (1-2).

This course will consist of special reports by students on current economic subjects, and a discussion and criticism of the same by the members of the class and the instructor. (DeVault.)

A. E. 203 y. *Research* (8)—Students will be assigned research work in agricultural economics under the supervision of the instructor. The work will consist of original investigation in problems of agricultural economics, and the results will be presented in the form of a thesis. (DeVault.)

A. E. 210 s. *Taxation in Relation to Agriculture* (2)—Two lectures.

Principles and practices of taxation in their relation to agriculture, with special reference to the trends of tax levies, taxation in relation to land utilization, taxation in relation to ability to pay and benefits received; a comparison of the following taxes as they affect agriculture—general property tax, income tax, sales tax, gasoline and motor vehicle license taxes, inheritance tax, and special commodity taxes; possibilities of farm tax reduction through greater efficiency and economies in local government. (DeVault and Walker.)

A. E. 211 f. *Taxation in Theory and Practice* (3)—Two lectures; one laboratory.

Ideals in taxation; economic effects of taxation upon the welfare of society; theory of taxation: the general property tax, business and license taxes, the income tax, the sales tax, special commodity taxes, inheritance and estate taxes; recent shifts in taxing methods and recent tax reforms:

conflicts and duplication in taxation among governmental units; practical and current problems in taxation. (DeVault and Walker.)

A. E. 212 f. *Land Utilization and Agricultural Production* (3)—Two double lecture periods a week.

A presentation, by regions, of the basic physical conditions of the economic and social forces that have influenced agricultural settlement, and of the resultant utilization of the land and production of farm products; followed by a consideration of the regional trends and interregional shifts in land utilization and agricultural production, and the outlook for further changes in each region. (Baker.)

A. E. 213 s. *Consumption of Farm Products and Standards of Living* (3)—Two double lecture periods a week.

A presentation of the trends in population and migration for the nation and by states, of the trends in exports of farm products and their regional significance, of the trends in diet and in per capita consumption of non-food products; followed by a consideration of the factors that appear likely to influence these trends in the future, and of the outlook for commercial as contrasted with a more self-sufficing agriculture. (Baker.)

A. E. 214 s. *Advanced Co-operation* (2)—Two lectures.

An appraisal of agricultural co-operation as a means of improving the financial status of farmers. More specifically, the course includes a critical analysis and appraisal of specific types and classes of co-operatives. (Coddington.)

AGRICULTURAL EDUCATION AND RURAL LIFE

Courses for Graduates and Advanced Undergraduates

R. Ed. 107 f. *Observation and Analysis of Teaching for Agricultural Students*, (3)—Two lectures: one laboratory. Prerequisite, Ed. Psych. 1 f.

This course deals with analysis of pupil learning in class groups.

(Cotterman.)

R. Ed. 109 f. *Teaching Secondary Vocational Agriculture* (3)—Three lectures. Prerequisites, R. Ed. 105 f, 107 f; A. H. 1, 2; D. H. 1; Poultry 1; Soils 1; Agron. 1, 2; Hort. 1, 11; F. Mech. 101, 104; A. E. 2, 102; F. M. 2.

A comprehensive course in the work of high school departments of vocational agriculture. It emphasizes particularly placement, supervised farming programs, the organization and administration of Future Farmer work, and objectives and methods in all-day, continuation, and adult instruction. (Cotterman.)

R. Ed. 110 s. *Rural Life and Education* (3)—Three lectures.

An intensive study of the educational agencies at work in rural communities, stressing particularly an analysis of school patronage areas, the possibilities of normal life in rural areas, early beginnings in rural education, and the conditioning effects of economic differences. The course is designed especially for persons who expect to be called upon to assist in shaping educational and other community programs for rural people.

(Cotterman.)

R. Ed. 112 s. *Departmental Organization and Administration* (1)—One lecture. Prerequisite, R. Ed. 105 f, 107 f, 109 f.

The work of this course is based upon the construction and analysis of administrative programs for high school departments of vocational agriculture. As a project, each student prepares and analyzes in detail an administrative program for a specific school. Investigations and reports. (Worthington.)

R. Ed. 114 s. *Teaching Farm Shop in Secondary Schools* (1)—One lecture.

Objectives in the teaching of farm shop; contemporary developments; determination of projects; shop management; shop programs; methods of teaching; equipment; materials of instruction; special projects. (Carpenter.)

R. Ed. 120 f or s. *Practice Teaching* (2)—Prerequisites, R. Ed. 105 f, 107 f, 109 f.

Under the immediate direction of a critic teacher the student in this course is required to analyze and prepare special units of subject-matter, plan lessons, and teach in co-operation with the critic teacher, exclusive of observation, not less than twenty periods of vocational agriculture. (Cotterman, Worthington.)

Courses for Graduates

R. Ed. 201 f and 202 s. *Rural Life and Education* (3, 3)—Prerequisite, R. Ed. 104 s, or equivalent. (Not offered in 1938-1939.)

A sociological approach to rural education as a movement for a good life in rural communities. It embraces a study of the organization, administration and supervision of the several agencies of public education as component parts of this movement and as forms of social economy and human development. Discussions, assigned readings and major term papers in the field of the student's special interest. (Cotterman.)

R. Ed. 207 f and 208 s. *Problems in Vocational Agriculture, Related Science and Shop* (1-2, each semester).

In this course special emphasis is placed upon the current problems facing teachers of vocational agriculture. It is designed especially for persons who have had several years of teaching experience in this field. The three phases of the vocational teacher's program—all day, part-time, and adult work—receive attention. Discussions, surveys, investigations and reports. (Cotterman.)

R. Ed. 250 y. *Seminar in Rural Education* (2-4).

Problems in the organization, administration and supervision of the several agencies of rural education. Investigation, papers and reports. (Cotterman.)

R. Ed. 251 y. *Research* (2-4)—Credit hours according to work done. Students must be specially qualified by previous work to pursue with profit the research to be undertaken. (Cotterman.)

AGRONOMY

Division of Crops

Courses for Graduates and Advanced Undergraduates

AGRON. 103 f. *Crop Breeding* (2)—One lecture; one laboratory. Pre-requisite, Gen. 101.

The principles of breeding as applied to field crops and methods used in crop improvement. (Kemp.)

AGRON. 121 s. *Methods of Crop and Soil Investigation* (2)—One lecture; one laboratory.

A consideration of crop and soil investigation methods at the various experiment stations, and the standardization of such methods. (Metzger.)

Courses for Graduates

AGRON. 201 y. *Crop Breeding* (4-10)—Credits determined by work accomplished.

The content of this course is similar to that of Agron. 103 f, but will be adapted more to graduate students, and more of a range will be allowed in choice of materials to suit special cases. (Kemp.)

AGRON. 203 y. *Seminar* (2)—One report period each week.

The seminar is devoted largely to reports by students on current scientific publications dealing with problems in crops and soils.

AGRON. 209 y. *Research* (4-8)—Credits determined by work accomplished.

With the approval of the head of the department the student will be allowed to work on any problem in agronomy, or he will be given a list of suggested problems from which he may make a selection. (Staff.)

Division of Soils

Courses for Graduates and Advanced Undergraduates

SOILS 112 s. *Soil Conservation* (3)—Three lectures.

A study of the factors relating to soil preservation, including the influence of cropping and soil management practices, fertilizer treatments, constructive and destructive agencies of man and nature on conservation, history of research work in soil erosion, and field trips to soil demonstration areas. (Thomas.)

Courses for Graduates

SOILS 201 y. *Special Problems and Research* (10-12).

Original investigation of problems in soils and fertilizers. (Staff.)

SOILS 202 y. *Soil Technology* (5 f, 2 s)—Two lectures, two laboratories, first semester; two lectures, one laboratory, second semester. Prerequisites, Geology 1, Soils 1, and Chemistry 1.

In the first semester, chemical and physico-chemical study of soil problems as encountered in field, greenhouse, and laboratory. In the second semester, physical and plant nutritional problems related to the soil.

(Thomas.)

SOILS 204 s. *Soil Microbiology* (3)—Two lectures; one laboratory. Prerequisite, Bact. 1.

A study of the microorganisms of the soil in relation to fertility. It includes the study of the bacteria of the soil concerned in the decomposition of organic matter, nitrogen fixation, nitrification, and sulphur oxidation and reduction, and deals also with such organisms as fungi, algae, and protozoa. The course includes a critical study of the methods used by experiment stations in soil investigational work. (Thom.)

ANIMAL HUSBANDRY

Courses for Graduates and Advanced Undergraduates

A. H. 111 f. *Livestock Markets and Marketing* (2)—Two lectures. Prerequisite, A. H. 2 s.

A comprehensive study of the marketing of sheep, beef cattle, hogs and draft horses, and practices found in the vast American livestock market system, together with the facilities available for the marketing and merchandising of all kinds of livestock and meat products. (Clark, Bogue.)

A. H. 112 s. *Geography of Livestock Production* (2)—Two lectures.

A course designed to familiarize students with livestock management, production and marketing practices in other parts of the world. Consideration is given to the bearing of foreign livestock and meat industries on this country's production, including an insight into our foreign markets. (Clark.)

A. H. 113 f. *Animal Nutrition* (3)—Three lectures. Prerequisites, Chem. 12A y and A. H. 102 f.

Processes of digestion, absorption, and metabolism of nutrients, nutritional balances, nature of nutritional requirements for growth, production and reproduction. (Meade.)

A. H. 114 s. *Advanced Breeding* (2)—Two lectures. Prerequisites, Gen. 101 f and A. H. 103 s.

This course deals with the more technical phases of heredity, variation, recombination, and mutation; selection and selection indexes; breeding systems; specific inheritance in farm animals and with biometry as applied to animal breeding. (Meade.)

Courses for Graduates

A. H. 201 f or s. *Special Problems in Animal Husbandry* (2-3)—Credit given in proportion to amount of work completed.

Problems which relate specifically to the character of work the student is pursuing will be assigned. (Staff.)

A. H. 202 f. or s. *Seminar* (1).

Students are required to prepare papers based upon current scientific publications relating to animal husbandry or upon their research work, for presentation before and discussion by the class. (Staff.)

A. H. 203 y. *Research*—Credit to be determined by the amount and character of work done.

With the approval of the head of the department, students will be required to pursue original research in some phase of animal husbandry, carry the same to completion, and report the results in the form of a thesis. (Meade, Clark.)

BACTERIOLOGY

Courses for Graduates and Advanced Undergraduates*

BACT. 101 f. *Milk Bacteriology* (3)—One lecture; two laboratories. Prerequisite, Bact. 1. Registration limited.

Bacteria in milk, sources and development; milk fermentation; sanitary production; care and sterilization of equipment; care and preservation of milk and cream; pasteurization; public health requirements. Standard methods of milk analysis; practice in the bacteriological control of milk supplies and plant sanitation; occasional inspection trips. (Black.)

BACT. 102 s. *Dairy Products* (3)—One lecture; two laboratories. Prerequisite; Bact. 1; Bact. 101 f desirable.

Relation of bacteria, yeasts and molds to cream, concentrated milks, starters, fermented milks, ice cream, butter, cheese, and other dairy products; sources of contamination. Microbiological analysis and control; occasional inspection trips.

BACT. 111 f. *Food Bacteriology* (3)—One lecture; two laboratories. Prerequisite, Bact. 1.

Bacteria, yeasts and molds in foods; relation to preservation and spoilage; food infections and intoxications; food control agencies and regulations. Microbiological examination of normal and spoiled foods; factors affecting preservation. (Bartram.)

BACT. 112 s. *Sanitary Bacteriology* (3)—One lecture; two laboratories. Prerequisite, Bact. 1. Registration limited.

Bacteriological and public health aspects of water supplies and water purification; swimming pool sanitation; sewage disposal; industrial wastes; disposal of garbage and refuse; municipal sanitation. Practice in standard methods for examination of water, sewage and other sanitary analysis; differentiation and significance of the coli-aerogenes group. (Bartram.)

BACT. 115 f. *Serology* (4)—Two lectures; two laboratories. Prerequisite, Bact. 2 s. Registration limited.

Infection and resistance; agglutination, precipitation, lytic and complement fixation reactions; principles of immunity and hypersensitiveness. Preparation of necessary reagents; general immunologic technique; factors affecting reactions; applications in identification of bacteria and diagnosis of disease. (Faber.)

BACT. 116 s. *Epidemiology* (2)—Two lectures. Prerequisite, Bact. 1 and credit in, or registration in Bact. 2 or 2 A. Alternates with Bact. 126 s.

* One or more of the scheduled courses may also be given during the evening if a sufficient number of students register. A special fee is charged.

Epidemiology of important infectious diseases, including history, characteristic features, methods of transmission, immunization and control; periodicity; principles of investigation; public health applications.

(Faber.)

BACT. 118 f. *Systematic Bacteriology* (2)—Two lectures. Prerequisite, Bacteriology, 10 hrs.

History of bacterial classification; genetic relationships, international codes of nomenclature; bacterial variation as it affects classification.

(James.)

BACT. 122 f and s. *Advanced Methods* (2)—One lecture; one laboratory. Prerequisite, 10 hours of bacteriology. Registration limited.

Microscopy, dark field and single cell technique, photomicrography; colorimetric and potentiometric determinations; oxidation-reduction; electrophoresis; surface tension; gas analysis; special culture methods; filtration; animal care; practice in media and reagent preparation.

(Bartram.)

BACT. 123 f, 124 s. *Bacteriological Problems* (2, 2)—Laboratory. Prerequisites, Bact. 1 and 2 and any other courses needed for the project. Registration limited.

Subject matter suitable to the needs of the particular student, or problems as an introduction to research, will be arranged. The problems are to be selected, outlined, and investigated in consultation with and under the supervision of a faculty member of the department.

(Staff.)

BACT. 125 f. *Clinical Methods* (3)—One lecture; two laboratories. Prerequisite, Bact. 2.

Methods of microscopic examination of the important constituents of blood, urine, gastric content, feces and exudates; correlation with qualitative and quantitative laboratory procedures.

(Bartram.)

BACT. 126 s. *Public Health* (1)—One lecture. Prerequisites, Bact. 1 and 2. Alternates with Bact. 116 s.

A series of weekly lectures on public health and its administration by staff members of the Maryland State Department of Health, representing each of the bureaus and divisions.

(James, in charge.)

BACT. 128 s. *Bacterial Metabolism* (2)—Two lectures. Prerequisites, Bact. 1, Chem. 12 f, or equivalent. Alternates with Bact. 206 s.

Growth, chemical composition, oxygen relations; enzymes; bacterial metabolism and respiration; chemical activities of microorganisms; changes produced in inorganic and organic compounds; industrial fermentations.

(Black.)

BACT. 131 f, 132 s. *Journal Club* (1, 1)—Prerequisites, Bact. 1 and 2.

Students will submit reports on current scientific literature or on individual problems in bacteriology, which will be discussed and criticized by members of the class and staff.

(Black.)

Courses for Graduates.

BACT. 205 f. *Research Methods* (1)—One lecture. Prerequisite, Bact. 6 hours.

Methods of research: library practice; current literature; preparation of papers; research institutions, investigators; laboratory design, equipment and supplies; academic practices; professional aids. (Black.)

BACT. 206 s. *Physiology of Bacteria* (2)—Two lectures. Prerequisites, Bact., 10 hours, and Chem. 10S s or equivalent. Alternates with Bact. 12S s.

Growth; chemical composition; physical characteristics; energy relationships; influence of environmental conditions on growth and metabolism; disinfection; physiological interrelationships; changes occurring in media. (James.)

BACT. 207 f, 208 s. *Special Topics* (1, 1). Prerequisite, Bact. 10 hours.

Presentation and discussion of fundamental problems and special subjects. (Black.)

BACT. 215 f or s. *Food Sanitation* (2)—Two lectures. Prerequisites, Bact. 1, Bact. 2, and Bact. 111, or their equivalent.

Principles of sanitation in food manufacture and distribution; methods of control of sanitation in commercial canning, pickling, bottling, preserving, refrigeration, dehydration, etc. (James.)

BACT. 221 f, 222 s. *Research* (1-6). Prerequisites, Bact. 1 and 2, and any other courses needed for the particular project. Credit will be determined by the amount and character of the work accomplished.

Properly qualified students will be admitted upon approval of the department head and with his approval the student may select the subject for research. The investigation is outlined in consultation with and pursued under supervision of a faculty member of the department. The results obtained by major students working towards an advanced degree are presented as a thesis, a copy of which must be filed with the department. (Staff.)

BACT. 231 f, 232 s. *Seminar* (2, 2). Prerequisites, Bact., 10 hours.

Discussions and reports prepared by the student on current research, selected subjects, and recent advances in bacteriology. (James.)

BOTANY

A. General Botany and Morphology

Courses for Graduates and Advanced Undergraduates

BOT. 101 f. *Plant Anatomy* (3)—One lecture; two laboratories. Prerequisite, Bot. 1 f.

The origin and development of the organs and tissue systems in the vascular plants, with special emphasis on the structures of roots, stems and leaves. Reports on current literature are required. (Bamford.)

BOT. 103 f. *Plant Taxonomy* (3)—One lecture; two laboratories.

Classification of the vegetable kingdom, and the principles underlying it; the use of other sciences and all phases of botany as taxonomic foundations; methods of taxonomic research in field, garden, herbarium and library. Each student to work on a special problem during some of the laboratory time. (Norton.)

BOT. 104 s. *Advanced Plant Taxonomy* (3)—One lecture; two laboratories. (Not given in 1938-1939.)

Principles and criteria of plant taxonomy. Reviews and criticisms of current taxonomic literature. Each student works on an original problem during the laboratory time. (Norton.)

BOT. 105 s. *Economic Plants* (2)—Two lectures.

The names, taxonomic position, native and commercial geographic distribution, and use of the leading economic plants of the world are studied. A collection of plant products from markets, stores, factories, etc., is made by students to illustrate the useful plants both in the natural form and as used by man. (Norton.)

BOT. 106 f. *History and Philosophy of Botany* (1)—One lecture.

Discussion of the development of ideas and knowledge about plants, also a survey of contemporary work in botanical science. (Norton.)

BOT. 107 f. *Methods in Plant Histology* (2)—Two laboratories.

Principles and methods involved in the preparation of permanent slides. (Brown.)

Courses for Graduates

BOT. 201 s. *Cytology* (4)—Two lectures; two laboratories. Prerequisite, BOT. 1 f.

A detailed study of the cell during its metabolic and reproductive stages. The major portion is devoted to chromosomes in mitosis and meiosis, and the relation of these stages to current theories of heredity and evolution. The laboratory involves the preparation, examination and illustration of cytological material by current methods. (Bamford.)

BOT. 202 s. *Plant Morphology* (2)—Two laboratories.

A comparative study of the morphology of the flowering plants with special reference to their phylogeny and development. (Bamford.)

BOT. 203 f and s. *Seminar* (1).

The study of special topics in plant morphology, anatomy and cytology. (Bamford.)

BOT. 204. *Research*. Credit according to work done. (Norton, Bamford.)

B. Plant Pathology and Mycology

Courses for Graduates and Advanced Undergraduates

PLT. PATH. 101 s. *Diseases of Fruits* (2-4)—Two lectures; laboratory according to credit desired. Prerequisite, Plt. Path. 1 f.

An intensive study intended to give a rather thorough knowledge of the subject matter, such as is needed by those who expect to become

advisers in fruit production, as well as those who expect to become specialists in plant pathology. (Woods.)

PLT. PATH. 102 s. *Diseases of Garden and Field Crops* (2-4)—Two lectures; laboratory according to credit desired. Prerequisite, Plt. Path. 1 f.

The diseases of garden crops, truck crops, cereal and forage crops. Intended for students of vegetable culture, agronomy, and plant pathology, and for those preparing for county agent work. (Temple.)

PLT. PATH. 103 s. *Research Methods* (2)—One conference and five hours of laboratory. Prerequisite, Plt. Path. 1 f or equivalent.

Technique of plant disease investigation: sterilization, cultural methods, isolation of pathogens, inoculation methods and photography. (Woods.)

PLT. PATH. 104 f and s. *Minor Investigations* (1-3)—Credit according to work done. A laboratory course with individual conferences. Prerequisite, Plt. Path. 1 f.

In this course, only minor problems or special phases of major investigations may be undertaken. Their solution may include a survey of the literature on the problem under investigation and both laboratory and field work. (Norton, Temple, Woods.)

PLT. PATH. 105 s. *Diseases of Ornamentals* (2)—Two lectures.

The most important diseases of plants grown in greenhouse, flower garden, and landscape, including shrubs and shade trees. (Temple.)

PLT. PATH. 106 y. *Seminar* (1).

Conferences and reports on plant pathological literature and on recent investigations. (Temple, Norton, Woods.)

PLT. PATH. 107 f. *Plant Disease Control* (3)—two lectures; one laboratory. Prerequisite, Plt. Path. 1 f.

An advanced course dealing with the theory and practice of plant disease control; the preparation of sprays and other fungicides and the testing of their toxicity in greenhouse and laboratory; demonstration and other extension methods adapted to county agent work and to the teaching of agriculture in high schools. (Temple.)

PLT. PATH. 108 f. *Mycology* (4)—Two lectures; two laboratories.

An introductory study of the morphology, life histories, classification, and economics of the fungi. (Norton, Woods.)

Courses for Graduates

PLT. PATH. 201 f. *Virus Diseases* (2)—Two lectures.

An advanced course, including a study of the current literature on the subject and the working of a problem in the greenhouse. (Temple.)

PLT. PATH. 203 f. *Non-Parasitic Diseases* (3)—Two lectures; one laboratory. (Not given in 1938-1939.)

Effects of maladjustment of plants to their environment; injuries due to climate, soil, gases, dust, sprays, fertilizers, improper treatment, and other detrimental conditions. (Norton.)

PLT. PATH. 205 y. *Research*—Credit according to work done.

(Norton, Temple, Woods.)

C. Plant Physiology

Courses for Graduates and Advanced Undergraduates

PLT. PHYS. 101 f. *Plant Physiology* (4)—Two lectures; two laboratories. Prerequisite, Bot. 1 f.

A summary view of the general physiological activities of plants. The aim in this course is to stress principles rather than factual details.

(Brown.)

PLT. PHYS. 102 s. *Plant Ecology* (3)—Two lectures; one laboratory. Prerequisite, Bot. 1 f.

The study of plants in relation to their environments. Plant formations and successions in various parts of the country are briefly treated. Much of the work, especially the practical, must be carried on in the field, and for this purpose type regions adjacent to the University are selected.

(Brown.)

Courses for Graduates

PLT. PHYS. 201 s. *Plant Biochemistry* (4)—Two lectures; two laboratories. Prerequisite, an elementary knowledge of plant physiology and organic chemistry.

An advanced course in plant physiology in which the chemical aspects are specially emphasized. It deals with the important substances in the composition of the plant body and with the important processes in plant life.

(Appleman, Shirk.)

PLT. PHYS. 202A f. *Plant Biophysics* (2)—Two lectures. Prerequisites, Bot. 1f, and Plt. Phys. 101f, or equivalent. Students electing this course should elect Plt. Phys. 202 Bf.

An advanced course dealing with the operation of physical forces in plant life processes.

(Appleman, Brown, duBuy.)

PLT. PHYS. 202B f. *Biophysical Methods* (2). (Shirk.)

PLT. PHYS. 203 s. *Plant Microchemistry* (2)—One lecture; one laboratory. Prerequisite, Bot. 1 f, Chem. 1 y, or equivalents.

The isolation, identification, and localization of organic and inorganic substances found in plant tissues by micro-technical methods. The use of these methods in the study of metabolism in plants is emphasized.

(Brown.)

PLT. PHYS. 204 f. *Growth and Development* (2). (Appleman, duBuy.)

PLT. PHYS. 205 f and s. *Seminar* (1).

Students are required to prepare reports of papers in the current literature. These are discussed in connection with the recent advances in the subject.

(Appleman.)

PLT. PHYS. 206 y. *Research*—Credit according to work done.

Students must be specially qualified by previous work to pursue with profit the research to be undertaken.

(Appleman, Brown, duBuy.)

BUSINESS ADMINISTRATION

Some of the specialized courses in the following lists may be offered only in alternate years, whenever prospective enrollments therein do not justify repeating annually. Such courses are so arranged, however, that students may include any course by election during a two-year period. Alternating courses are indicated as follows:

* Offered 1938-39. May or may not be offered in 1939-40.

† Offered 1939-40. May or may not be offered in 1938-39.

A. Accounting

Courses for Graduates and Advanced Undergraduates

Acct. 101 f. *Advanced Accounting I* (3)—Three lectures. Prerequisite, Acct. 52 s.

Advanced theory and problems in connection with the following: working papers, statements; corporations; actuarial science; cash; accounts receivable; notes and acceptances; inventories, consignments; installment sales.

Acct. 102 s. *Advanced Accounting II* (3)—Three lectures. Prerequisite, Acct. 101 f.

Advanced theory and problems in connection with the following: tangible fixed assets; intangible assets; investments; liabilities; funds and reserves; correction of statements and books; comparative statements; the analysis of working capital; miscellaneous ratios; profit and loss analysis; and statement of application of funds.

Acct. 121 f. *Cost Accounting* (2)—Two lectures. Prerequisite, Acct. 52 s.

The need and value of cost accounting; cost systems and cost classifications; classification of accounts; subsidiary ledgers and cost records; outline of specific order cost accounting; accounting for material; material storage and consumption; valuation of materials; accounting for labor costs; special features of accounting for labor cost; accounting for manufacturing expense; distribution of service department costs; distribution of manufacturing expense to production; control of distribution costs; monthly closing entries. Theory, problems, and practice set. (Cissel.)

Acct. 122 s. *Advanced Cost Accounting* (2)—Two lectures. Prerequisite, Acct. 121 f.

Preparation of analytical statements; comparative statements; process cost accounting; standard costs; analysis of variances; accounting for standard costs; estimating cost systems; special considerations; arguments for and against including interest on investments; graphic charts; uniform methods. A discussion of advanced theory and problems. (Cissel.)

Acct. 161 f. *Income Tax Procedure* (3)—Three lectures. Prerequisite, Acct. 102 s.

Income tax in theory and practice. Selected cases and problems illustrating the definition of taxable income of individuals, corporations, and estates. (Wedeborg.)

Acct. 171 f. *Auditing Theory* (2)—Two lectures. Prerequisite, Acct. 102 s.

Principles of auditing, including a study of different kinds of audits, the preparation of reports, and illustrative cases or problems. (Cissel.)

Acct. 172 s. *Practical Auditing* (2)—Two lectures. Prerequisite, Acct. 171 f.

A practical application of auditing theory. (Cissel.)

Acct. 181 f. *Specialized Accounting* (3)—Three lectures. Prerequisite, Acct. 102 s.

Accounting for partnerships; ventures; insurance; receiverships; branches; consolidations; mergers; foreign exchange; estates and trusts; budgets; and public accounts. (Wedeborg.)

Acct. 182 s. *Specialized Accounting* (3)—Three lectures. Prerequisite, Acct. 181 f.

A study of the accounting methods and problems of the following types of business: savings banks, commercial banks, national banks, building and loan associations, stock brokerage, consignments, department stores, real estate, extractive industries, hotels, government, electric utilities, and others. (Wedeborg.)

Courses for Graduates

Acct. 228 f, 229 s. *Accounting Systems* (3, 3). Prerequisite, Acct. 181 and 182. Students who do not have these prerequisites must attend all classes in Acct. 181 and 182 concurrently.

A discussion of the more difficult problems in connection with the industries covered in Acct. 181 and 182. Also includes the statement of affairs; realization and liquidation account; parent and subsidiary accounting; and financing. (Wedeborg.)

Acct. 299 f or s. *Special Problems in Accounting* (3). Prerequisite, preliminary courses in the field of specialization, and permission of the instructor.

Investigations of specific problems as directed by individual conferences with the instructor. The subjects selected for investigation may be closely allied with, but must not be the same as, the subject discussed in the student's major thesis. (Wedeborg.)

B. Finance

Courses for Graduates and Advanced Undergraduates

FINANCE 105 f.* *Consumer Financing* (3)—Prerequisite, Econ. 52 or 57.

The economics of installment selling; methods of financing the consumer; and operations of the personal finance company. (Gruchy.)

FINANCE 106 f.† *Public Finance* (3)—Prerequisite, Econ. 52 or 57. (Equivalent to former Econ. 114 s.)

The nature of public expenditures; sources of revenue; taxation; and budgeting. Special emphasis on the practical, social, and economic problems involved. (Gruchy.)

FINANCE 111 s. *Corporation Finance* (3)—Prerequisite, Econ. 52. (Not open to students who have credit in former Econ. 103 f.)

The organization and financing of a business enterprise. Types of securities and their utilization in apportioning income, risk, and control. Problems of capitalization, refunding, reorganization, and expansion. Procurement of capital. Public regulation of the sale of securities (Stevens.)

FINANCE 115 f. *Investments* (3)—Prerequisite, Finance 111 f. (Equivalent to former A. & F. 104 s.)

Sources of information for the investor. Classes of investments, government bonds, municipals, real estate mortgages, public utilities, railroads, industrial securities, movement of security prices, analysis of financial statements. Adapting the investment policy to the purpose and needs of the investor. (Stevens, Mullin.)

FINANCE 116 s.† *Investment Banking* (3).

A study of the functions and operations of investment banking institutions and their relation to the market for long-term credit and with emphasis on the trends and problems of investment banking.

FINANCE 118 f.† *Stock and Commodity Exchanges* (3).

An analysis of the operations of the various exchanges. Brokerage houses and methods of trading. Regulation of the exchanges.

FINANCE 121 s.* *Banking Principles and Practices* (3).

The incorporation, organization, and operation of banks. Functions of departments and problems of customer relations. Bank legislation and governmental regulation. (Gruchy.)

FINANCE 125 f.* *Credits and Collections* (3).

Nature and function of credit and use of credit instruments. Principles of credit investigation and analysis. The work of the credit manager. (Gruchy.)

FINANCE 129 f.† *International Finance* (3).

Foreign exchange theory and practice. International aspects of monetary and banking problems. International money markets. The gold problem and The Bank For International Settlements. (Gruchy.)

FINANCE 141 f. *Insurance* (3)—Prerequisite, Econ. 52. (Similar subject matter to former Econ. 105 s.)

A survey of the major principles and practices of life and property insurance, with special reference to their relationship to our social and economic life.

FINANCE 151 s. *Real Estate* (3)—Prerequisite, Econ. 52.

The principles and practices involved in owning, operating, merchandising, leasing, and appraising real estate and real estate investments.

FINANCE 199 s. *Financial Analysis and Control* (3)—Prerequisite, Finance 111 f.

Internal administration of a business from the viewpoint of the chief executive. Departmentalization and functionalization, anticipation and budgetary control of sales, purchases, production, inventory, expenses, and assets. The coordination of financial administration. Policy determination, analysis and testing. (Stevens.)

Courses for Graduates

FINANCE 201 f, 202 s. *Research* (1-3, each semester). Credit in proportion to work accomplished. Prerequisite, consent of the instructor. Students must be especially qualified by previous work to pursue effectively the research to be undertaken.

Investigation or original research in problems of finance under supervision of the instructor. (Gruchy.)

FINANCE 299 f or s. *Special Problems in Finance* (1-3, each semester). Prerequisite, preliminary courses in the field of specialization, and permission of the instructor concerned.

Individual study of specific problems as directed by the instructor.

The subjects selected for investigation may be closely allied with, but must not be the same as, the subject discussed in the student's major thesis. (Stevens, Gruchy.)

C. Marketing

See also related courses in Psychology, especially Psych. 3 s, 140 f, and 141 s.

Courses for Graduates and Advanced Undergraduates

MKT. 101 f. *Marketing Principles* (3)—Prerequisite, Econ. 52 s. (Equivalent to former A. & F. 140 s.)

A study of the fundamental principles of assembling and dispersing manufactured goods; functions of wholesale and retail middlemen; branch house distribution; mail order and chain store distribution; price and price policies; cash and quality discounts; price maintenance; and a discussion of the problem of distribution costs. (Reid.)

MKT. 105 s.* *Salesmanship and Salesmanagement* (3)—Prerequisite, Econ. 52 or 57.

An analysis of the fundamental principles of salesmanship and the technique of personal presentation of ideas, goods, and services. Analysis of customer buying motives, habits, and sales reactions. The structure and function of the sales organization and its relation to the activities of the production and other departments. Building, training, equipping, stimulating and supervising a sales force. (Reid.)

MKT. 109 f.* *Advertising Principles* (3)—Prerequisite, Econ. 52 s. (Equivalent to former A. & F. 142 s.)

Functions and economic implications of advertising; selection and adaptation of media to various lines of business. Layouts, copywriting, and campaign planning. Objectives, appropriations, and measurements of effectiveness. (Mullin.)

MKT. 115 s.* *Purchasing Technique* (3).

Ascertaining sources of supply; substitutes; utilization of catalogues, files, pooled information, and cooperative purchasing; buying on specifications, sampling, testing, bargaining, terms, discounts, relations with salesmen. Procurement, analysis, and interpretation of market and price data. Materials control. Interdepartmental and office organization. (Reid.)

MKT. 119 s.† *Retail Store Management and Merchandising* (3)—Prerequisite, Mkt. 101 f.

Retail store organization, location, and store policy; pricing policies, price lines, brands, credit policies; records as a guide to buying; budgetary control of inventory and expenses; purchasing methods; supervision of selling; training and supervision of retail sales force; administrative problems.

MKT. 199 s.† *Marketing Research and Market Policies* (3)—Prerequisite, nine credit hours in marketing.

A study of the methods and problems involved in marketing research in establishing or determining marketing problems. (Stevens, Reid.)

Courses for Graduates

MKT. 201 f, 202 s. *Research* (1-3, each semester)—Credit in proportion to work accomplished. Prerequisite, consent of the instructor. Students must be especially qualified by previous work to pursue effectively the research to be undertaken.

Investigation or original research in problems of marketing under supervision of the instructor. (Marketing Staff.)

MKT. 299 f or s. *Problems in Marketing* (1-3, each semester). Prerequisite, preliminary courses in the field of specialization, and permission of the instructor.

Individual study of specific problems as directed by the instructor.

The subjects selected for investigation may be closely allied with, but must be the same as, the subject discussed in the student's major thesis. (Marketing Staff.)

D. Trade and Transportation.

Courses for Graduates and Advanced Undergraduates

T. & T. 101 f. *Principles of Foreign Trade* (3)—Prerequisite, Econ. 52 s, T. & T. 1 f, 4 s. (Equivalent to former Econ. 116 s.)

The basic principles of import and export trade, as influenced by the differences in methods of conducting domestic and foreign commerce. (Daniels.)

T. & T. 111 f.* *Inland Transportation* (3)—Prerequisite, Econ. 52 or 57. (Similar to former Econ. 112 s.)

The development of inland means of transportation in the United States. This course is devoted largely to a survey of railway transportation. Some study is given to other transportation agencies. (Daniels.)

T. & T. 112 s.* *Ocean Transportation* (2)—Prerequisite, T. & T. 1 f, 4 s.

The development of merchant marine and ocean trade routes; the function of the merchant marine in the present commerce of the world; relation of merchant marine to the railroad and other transportation agencies. Special stress is laid on the history and present position of the American Merchant Marine.

T. & T. 121 s.† *The Technique of Export Trade* (1)—Prerequisite, T. & T. 101 f.

Practical problems of exporting, including the study of functions of the various exporting agencies; and documents and procedures used in exporting transactions. (Daniels.)

T. & T. 122 s.† *The Technique of Import Trade* (1)—Prerequisite, T. & T. 101 f.

This course involves the study of methods of procuring goods in foreign countries; financing of import shipments; documentary procedures; clearing through the customs districts; and distribution of goods in the United States. (Daniels.)

T. & T. 123 s.† *Import and Export Practice* (1-2)—Prerequisite, concurrent registration in T. & T. 121 s or 122 f.

Practice work in dealing with import and export documents. Field trips are also arranged to Baltimore to study actual import and export procedure. A nominal fee is collected at the time of the field trip to cover the expenses incurred. (Daniels.)

FOREIGN TRADING AREAS :

The following three courses apply to particular areas the analysis of foreign markets and methods discussed in Principles of Foreign Trade (T. & T. 101 f). Lecture hours are arranged in such a way that these courses may be taken as a group, or any one or more may be taken independently.

T. & T. 131 f.† *Europe as An Export Field* (1)—Prerequisite, T. & T. 101, 123.

An analysis of the countries of Europe as a market for American goods, including a study of the various products imported, methods of financing, and distribution agencies.

T. & T. 132 f.† *Latin America as An Export Field* (1)—Prerequisite, T. & T. 101, 123.

An analysis of the countries of Central and South America as a market for American goods, including a study of the various products imported, methods of financing, and distribution agencies.

T. & T. 133 f.† *Asia as An Export Field* (1)—Prerequisite, T. & T. 101, 123.

An analysis of the countries of Asia as a market for American goods, including a study of the various products imported, methods of financing, and distribution agencies.

T. & T. 189 s.† *International Commerce and Commercial Policy* (3)—Prerequisite, T. & T. 131, 132, 133.

Production, availability, and World Commerce in the staple commodities of world trade: agricultural, mineral, and manufactured; and the effects of the principal commercial policies and treaties. (Daniels.)

Courses for Graduates

T. & T. 299 f or s. *Special Problems in Foreign Trade* (1-3, each semester)—Prerequisite, preliminary courses in the field of specialization, and permission of the instructor.

Individual study of specific problems as directed by the instructor.

The subjects selected for investigation may be closely allied with, but must not be the same as, the subject discussed in the student's major thesis.
(Daniels, Reid.)

E. Organization and Management

See also related courses in Psychology, especially Psych. 3 s, 160 f, and 161 s.

Courses for Graduates and Advanced Undergraduates

O. & M. 101 f. *Business Law* (3).

Section I. The principles of the law of contracts and sales.

Section II. Prerequisite, major in Accounting or consent of the instructor. A more intensive treatment of the law of contracts and sales than is given in Section I, and designed to prepare students for the accounting profession in Maryland.
(Layton.)

O. & M. 102 s. *Business Law* (3).

Section I. Prerequisite, O. & M. 101, Section I. The principles of the law of negotiable instruments, agency, partnerships, and corporations.

Section II. Prerequisite, O. & M. 101, Section II. A more intensive treatment of the law of negotiable instruments, agency, and partnerships than is given in Section I, and designed to prepare students for the accounting profession in Maryland.
(Layton.)

O. & M. 103 f. *Advanced Business Law* (3)—Prerequisite, O. & M. 101 and 102, Section II.

The principles of the law of corporations, trusts, and the administration of the estates of bankrupts and decedents, presented in a manner calculated to prepare students for the accounting profession in Maryland.
(Layton.)

O. & M. 110 f. *Fundamentals of Business Administration* (2)—Open only to Senior Engineers. Graduate students majoring in non-economic subjects may be admitted by special consent of instructor.

An analysis of the business structure, showing the functions of production, marketing, and finance, and the use of the tools of accounting and statistics. Designed to show the engineer his relationship as a functional expert to other functional experts and to give an academic opportunity to apply technical knowledge in business problems.
(Layton.)

O. & M. 121 s. *Industrial Management* (3)—Prerequisite, Econ. 52 or 57.

A study of major problems of management in the acquisition, organization, and control of the factors and agents of production—plant, machinery and equipment, raw materials, and personnel. Factory location and layout. Scheduling. Personnel organization and incentives.

Courses for Graduates

O. & M. 201 f, 202 s. *Research* (1-3, each semester)—Credit in proportion to work accomplished. Prerequisite, consent of the instructor. Students must be especially qualified by previous work to pursue effectively the research to be undertaken.

Investigation or original research in problems of business organization and operation under supervision of the instructor. (Staff.)

O. & M. 208 s. (2) *Legal Aspects of Business Problems*—(Not offered 1938-39.)

Law as an institution conditioning economic behavior. The law applicable to problems in management and production, marketing, and finance. (Layton.)

O. & M. 291 f, s. *Problems in Business Organization* (1-3, each semester)—Prerequisite, preliminary courses in the field of specialization, and permission of the instructor.

Individual investigations of specific problems under direction of the instructor. The subjects selected for investigation may be closely allied with, but must not be the same as, the subject discussed in the student's major thesis. (Layton.)

O. & M. 299 f, s. *Problems in Cooperative Administration* (1-3, each semester)—Prerequisite, preliminary courses in the field of specialization, and permission of the instructor.

Problems may involve practical work with the National Cooperative Council and other Washington, D. C., or Maryland cooperative organizations. The subjects selected for investigation may be closely allied with, but must not be the same as, the subject in the student's major thesis. (Stevens.)

CHEMISTRY

A. General Chemistry

Courses for Graduates

CHEM. 200 Ay. *Chemistry of the Rarer Elements* (4)—Two lectures. Prerequisite, Chem. 2 y.

This course is devoted to a study of the elements not usually considered in the elementary course. (White.)

CHEM. 200 By. *Advanced Inorganic Laboratory* (4)—Two laboratories. Prerequisite, consent of the instructor.

A laboratory study of the analyses and the compounds of elements considered in Chem. 200 Ay. (White.)

CHEM. 201 f or s. *An Introduction to Spectrographic Analysis* (1).

This is a laboratory course designed to give the student the fundamental principles of spectrographic analysis. (White.)

CHEM. 202 y. *Theory of Solutions* (4)—Two lectures. Prerequisite, Chem. 102 Ay.

A systematic study of the theories and properties of solutions. Subjects considered are solubility, regular solutions, dipole moments, solution kinetics, modern theories of dilute and concentrated electrolytes.

(Svirbely.)

CHEM. 230 f. *Chemical Microscopy* (1).

A laboratory course designed to give the student the fundamental principles of microscopic analysis.

(White.)

B. Analytical Chemistry

Courses for Graduates and Advanced Undergraduates

CHEM. 101 y. *Advanced Quantitative Analysis* (10)—Two lectures; three laboratories. Prerequisite, Chem. 6 y or its equivalent.

A broad survey of the field of inorganic quantitative analysis. In the first semester mineral analysis is given. Included in this is analysis of silicates, carbonates, etc. In the second semester the analysis of steel and iron is taken up. However, the student is given wide latitude as to the type of quantitative analysis he pursues during the second semester.

(Wiley.)

C. Organic Chemistry

Courses for Graduates and Advanced Undergraduates

CHEM. 116 y. *Advanced Organic Chemistry* (4)—Two lectures. Prerequisite, Chem. 8 A y and B y, or their equivalent.

This course is devoted to a more advanced study of the compounds of carbon than is undertaken in Chem. 8 Ay. Graduate students who desire an accompanying laboratory course should elect Chem. 210 y.

(Drake.)

CHEM. 117 y. *Organic Laboratory* (2)—One laboratory.

This course is devoted to an elementary study of organic qualitative analysis. The work includes the identification of unknown organic compounds, and corresponds to the more extended course, Chem. 207.

(Williams.)

CHEM. 118 y. *Advanced Organic Laboratory* (2)—One laboratory.

A study of organic quantitative analysis and the preparation of organic compounds. Quantitative determinations of carbon and hydrogen, nitrogen, and halogen are carried out, and syntheses more difficult than those of Chem. 8 By are studied.

(Williams.)

Courses for Graduates

CHEM. 203 f or s. *Special Topics in Organic Chemistry* (2-4-6)—A lecture course, which will be given any half-year when there is sufficient demand.

The course will be devoted to an advanced study of topics which are too specialized to be considered in Chem. 116 y. Topics that may be covered are dyes, drugs, carbohydrates, plant pigments, etc. The subject matter will be varied to suit best the needs of the particular group enrolled, and a student may register for the course for three semesters and acquire a total of six credits.

(Drake.)

CHEM. 205 f or s. *Organic Preparations* (4)—A laboratory course, devoted to the synthesis of various organic compounds.

This course is designed to fit the needs of students whose laboratory experience has been insufficient for research in organic chemistry.

(Williams.)

CHEM. 206 f or s. *Organic Microanalysis* (4)—A laboratory study of the methods of Pregl for the quantitative determination of halogen, nitrogen, carbon, hydrogen, methoxyl, etc., in very small quantities of material.

This course is open only to properly qualified students, and the consent of the instructor is necessary before enrollment.

(Drake.)

CHEM. 207 f or s. *Organic Qualitative Analysis* (variable credit to suit student, with a minimum of 2 and a maximum of 6 credits.)

Laboratory work devoted to the identification of pure organic substances and of mixtures. The text used is Kamm's Qualitative Organic Analysis.

This course should be taken by students seeking a higher degree, whose major is organic chemistry. The work is an excellent preparation for the problems of identification one is likely to encounter while conducting research.

(Williams.)

CHEM. 210 y. *Advanced Organic Laboratory* (4 or 6).

Students electing this course should elect Chem. 116 y. The content of the course is essentially that of Chem. 117 y and 118 y, but may be varied within wide limits to fit the needs of the individual student.

(Williams.)

B. Physical Chemistry

Courses for Graduates and Advanced Undergraduates

CHEM. 102 A y. *Physical Chemistry* (6)—Three lectures. Prerequisites, Chem. 6 y; Phys. 2 y; Math. 16 y.

For those taking laboratory, graduate students will elect Chem. 219 f and s (4), and undergraduates Chem. 102 B y (4).

This course aims to furnish the student with a thorough background in the laws of theories of chemistry. The gas laws, kinetic theory, liquids, solutions, elementary thermodynamics, thermochemistry, equilibrium, chemical kinetics, etc., will be discussed.

(Haring.)

CHEM. 103 y. *Elements of Physical Chemistry* (6)—Two lectures; one laboratory. Prerequisites, Chem. 1 y; Phys. 1 y; Math. 8 f and 10 s or 11 f and 14 s.

(Lamb.)

This course is designed to meet the needs of premedical students and others unable to pursue the subject further. Subjects discussed are gases and liquids, solutions, electrolytic conductance, colloidal solutions, thermochemistry, equilibria including indicators and buffers, reaction rates, electrochemistry including pH, etc. Quantitative experiments on these subjects are performed in the laboratory.

CHEM. 105 y. *Electrochemistry* (4)—Two lectures. Prerequisite, Phys. Chem. 102 A y.

This course is intended especially for chemical engineers. The first semester emphasizes theory and the second semester practical applications.

(Haring.)

Courses for Graduates

Note: CHEM. 102 A y and 102 B y or their equivalent are prerequisites for all advanced courses in physical chemistry.

CHEM. 212 A f and s. *Colloid Chemistry* (4)—Two lectures. (Not given in 1938-39.)

This is a thorough course in the chemistry of matter associated with surface energy. First semester, theory; second semester, practical applications. (Haring.)

CHEM. 212 B f and s. *Colloid Chemistry Laboratory* (4)—Two laboratories, which must accompany or be preceded by Chem. 212A f and s. (Not given in 1938-39.) (Haring.)

CHEM. 213 f. *Phase Rule* (2)—Two lectures.

A systematic study of heterogeneous equilibria. One, two, and three component systems will be considered, with practical applications of each. (Haring.)

CHEM. 214 f and s. *Structure of Matter* (2)—Two lectures. (Not given in 1938-39.)

Subjects considered are radioactivity, isotopes, the Bohr and Lewis-Langmuir theories of atomic structures, and allied topics. (Lamb.)

CHEM. 215 s. *Catalysis* (2)—Two lectures.

This course consists of lectures on the theory and applications of catalysis. (Haring.)

CHEM. 216 f and s. *Reaction Kinetics* (4)—Two lectures.

A study of reaction velocity in liquid and gaseous systems and the effect of heat, light, etc., on the same. (Lamb.)

CHEM. 217 A f and s. *Electrochemistry* (4)—Two lectures.

A study of the principles and some of the practical applications of electrochemistry. First semester, theory; second semester, practical applications. (Haring.)

CHEM. 217 B f and s. *Electrochemistry Laboratory* (4)—Two laboratories, which must accompany or be preceded by Chem. 217 A f and s. (Haring.)

CHEM. 218 y. *Chemical Thermodynamics* (4)—Two lectures. (Not given in 1938-39.)

A study of the methods of approaching chemical problems through the laws of energy. (Haring.)

CHEM. 219 f and s. *Physical Chemistry Laboratory* (4 or 6)—Two laboratories and one conference.

Students taking this course may elect 6 credits of lectures in Chem. 102 A y to replace the conference. (Lamb.)

E. Biological Chemistry

Courses for Graduates and Advanced Undergraduates

CHEM. 106 f or s. *Dairy Chemistry* (4)—One lecture; three laboratories. Prerequisites, Chem. 12 A y and Chem. 12 B y.

Lectures and assigned reading on the constituents of dairy products. This course is designed to give the student a working knowledge and laboratory practice in dairy chemistry and analysis. Practice is given in examining dairy products for confirmation under the food laws, detection of watering, detection of preservatives and added colors, and the detection of adulterants. Students showing sufficient progress may take the second semester's work, and elect to isolate and make complete analysis of the fat or protein of milk. (Broughton.)

CHEM. 108 s. *General Physiological Chemistry* (4)—Two lectures; two laboratories. Prerequisites, Chem. 12 A y and Chem. 12 B y or their equivalent.

This course is a study of the fundamental principles of human nutrition, the chemistry of foods, digestion, absorption, assimilation, tissue composition, and excretion. The laboratory work consists of experiments in food analysis; salivary, gastric, pancreatic and intestinal digestion; and respiration. (Supplee.)

CHEM. 115 f or s. *Food Analysis* (3)—Three laboratories. Prerequisite, Chem. 4 f or s, or Chem. 12 A y and Chem. 12 B y.

This course is designed to give the student broad training in the analytical methods used in the food and feed industries. (Supplee.)

Courses for Graduates

CHEM. 208 s. *Biological Analysis* (3)—Three laboratories.

A course in analytical methods of special value to students whose major field is the biological sciences. The work is varied to suit the needs or interests of the individual when possible. (Supplee.)

CHEM. 221 f or s. *Tissue Analysis* (3)—Three laboratories. Prerequisite, Chem. 12 A y and 12 B y or their equivalent.

A discussion and the application of the analytical methods used in determining the inorganic and organic constituents of plant and animal tissue. (Broughton.)

CHEM. 223 A f and s. *Physiological Chemistry* (4)—Two lectures. Prerequisite, Chem. 12 A y and Chem. 12 B y or their equivalent.

An advanced course in physiological chemistry. For the first semester the course consists of lectures and assigned reading on the constitution and reactions of proteins, fats, carbohydrates, and allied compounds of biological importance. The second semester deals with enzyme action, digestion, absorption, metabolism, and excretion. (Supplee.)

CHEM. 223 B f. *Physiological Chemistry Laboratory* (2). Prerequisites, Chem. 4 f or s and Chem. 12 A y and 12 B y.

A laboratory course to accompany Chem. 223 A f. Qualitative and quantitative analysis of foods; salivary, gastric, pancreatic, and intestinal digestion; and respiration. (Supplee.)

CHEM. 224 f or s. *Special Problems* (4-S)—A total of eight credit hours may be obtained in this course by continuing the course for two semesters. Laboratory, library, and conference work amounting to a minimum of ten hours each week. Prerequisites, Chem. 223 A f and s, and consent of instructor.

This course consists of studies of special methods, such as the separation of the fatty acids from a selected fat, the preparation of carbohydrates or amino acids, and the determination of the distribution of nitrogen in a protein. The students will choose, with the advice of the instructor, the particular problem to be studied. (Supplee.)

F. History of Chemistry

CHEM. 121 y. *The History of Chemistry* (2)—One lecture. Prerequisite, Chem. 1 y and Chem. 8 y or their equivalent. Required of senior students in the Department of Chemistry. (Not given in 1938-39.)

The development of chemical knowledge, and especially of the general doctrines of chemistry which have been gradually evolved, from their earliest beginnings up to the present day. (Broughton.)

G. Seminar and Research

CHEM. 228 f and s. *Seminar* (2)—Required of all graduate students in chemistry.

Students are required to prepare reports on papers in the current literature. These are discussed in connection with the recent advances in the subject. (Staff.)

CHEM. 229 f or s. *Research in Chemistry*. The investigation of special problems and the preparation of a thesis towards an advanced degree. (Staff.)

CHEMICAL ENGINEERING

Courses for Graduates and Advanced Undergraduates

CH. E. 101 f. *Heat Transfer and Fluid Flow* (3)—Two lectures; one laboratory.

A theoretical discussion of heat transfer and fluid flow, with illustrative problems and related laboratory work.

CH. E. 102 s. *Water, Fuels and Lubricants* (3 or 4)—Two lectures; one or two laboratories. Prerequisites, Chem. 8 A y and 8 B y, Phys. 2 y. The three credit hour course is designed for mechanical engineers, who may take the course without the prerequisite Chem. 8 A y and 8 B y.

Laboratory work consists of exercises in the usual control methods for testing water, fuels or lubricants and some related engineering materials.

CH. E. 103 y. *Elements of Chemical Engineering* (6)—Three lectures. Prerequisites, Chem. 8 A y and B y, Phys. 2 y.

Theoretical discussion of general underlying philosophy and methods in Chemical Engineering, such as presentation of data, material balances, and heat balances. Illustrated by consideration of typical problems and processes.

CH. E. 104 y. *Chemical Engineering Seminar* (2). Required of all students in Chemical Engineering.

Students prepare reports on current problems in Chemical Engineering and participate in the discussion of such reports.

CH. E. 105 y. *Advanced Unit Operations* (10)—Two lectures; three laboratories. Prerequisite, Elements of Chemical Engineering, Ch. E. 103 y.

Advanced theoretical treatment of fluid flow, heat flow, evaporation, humidity, distillation, absorption, scrubbing, and analogous unit operations typical of Chemical Engineering. Problems and laboratory operations of small scale semi-commercial type equipment.

CH. E. 106 s. *Minor Problems* (7). Prerequisite, permission of Department of Chemical Engineering.

Original work on a special problem assigned to each student, including preparation of a complete report covering the study.

CH. E. 107 f. *Fuels and their Utilization* (5)—Two lectures; two laboratories. Prerequisite, permission of Department of Chemical Engineering.

A study of the sources of solid, liquid and gaseous fuels, their economic conversion, distribution and utilization. Problems, laboratory preparation, control and utilization.

CH. E. 108 y. *Chemical Technology* (4)—Two lectures. Prerequisite, Elements of Chemical Engineering, Ch. E. 103 y. Also open to advanced students in Chemistry.

A study of the principal chemical industries. Plant inspection, trips, reports and problems.

Courses for Graduates

CH. E. 201 y. *Graduate Unit Operations* (10 or more). Prerequisite, permission of Department of Chemical Engineering.

Advanced theoretical treatment of typical unit operations in Chemical Engineering. Problems. Laboratory operation of small scale semi-commercial type equipment with supplementary reading, conferences and reports.

CH. E. 202 s. *Gas Analysis* (3)—One lecture; two laboratories. Prerequisite, permission of Department of Chemical Engineering.

Quantitative determination of common gases, fuel gases, gaseous vapors and important gaseous impurities. Problems.

CH. E. 203 f, 204 s. *Graduate Seminar* (2). Required of all graduate students in Chemical Engineering.

Student prepare reports on current problems in Chemical Engineering and participate in the discussion of such reports.

CH. E. 205 or 206 s. *Research in Chemical Engineering*.

The investigation of special problems and the preparation of a thesis in partial fulfillment of the requirements of an advanced degree.

COMPARATIVE LITERATURE

Courses for Graduates and Advanced Undergraduates

The work in Comparative Literature is offered jointly by the faculties of the Department of English and the Department of Modern Languages.

A minor only may be taken in Comparative Literature. English 113 f and 114 s may be counted as Comparative Literature by students who have had Comparative Literature 105 f and 106 s. English 124 s may also be counted as Comparative Literature.

COMP. LIT. 101 f. *Introduction to Comparative Literature* (3)—Three lectures.

Survey of the background of European literature through study in English translations of Greek and Latin literature. Special emphasis is laid on the development of the epic, tragedy, comedy, and other typical forms of literary expression. The debt of modern literature to the ancients is discussed and illustrated. (Prahl.)

COMP. LIT. 102 s. *Introduction to Comparative Literature* (3)—Three lectures.

Continuation of Comp. Lit. 101 f; study of medieval and modern Continental literature. (Prahl.)

COMP. LIT. 103 f. *Types of World Literature* (2)—Two lectures.

An historical and critical survey of the principal types of world literature, with special attention to the influence of classical myth and legend and of classical literary ideals upon English and American writers. (Harman.)

COMP. LIT. 104 s. *The Old Testament as Literature* (2)—Two lectures. A study of the sources, development, and literary types. (Hale.)

COMP. LIT. 105 f. *Romanticism in France* (3)—Three lectures.

Lectures and readings in the French romantic writers from Rousseau to Baudelaire. Texts to be read in English. (Wilcox.)

COMP. LIT. 106 s. *Romanticism in Germany* (3)—Three lectures.

Continuation of Comp. Lit. 105 f. German literature from Buerger to Heine. The reading is done in English translations. (Prahl.)

COMP. LIT. 107 f. *The Faust Legend in English and German Literature* (2)—Two lectures.

A study of the Faust Legend of the Middle Ages and its later treatment by Marlowe in *Dr. Faustus* and by Goethe in *Faust*. (Prahl.)

COMP. LIT. 110 y. *The Modern Continental Drama* (2)—Two lectures.

The Continental drama of the last fifty years (the English drama not included) will be studied as an expression of modern thought and as an art form. (Prahl.)

DAIRY HUSBANDRY

Courses for Graduates and Advanced Undergraduates

D. H. 105 s. *Advanced Study of Dairy Breeds* (2)—One lecture; one laboratory. Prerequisite, D. H. 2 s.

A study of the historical background, characteristics, noted individuals and families, and the more important blood lines in the Holstein, Guernsey, Ayrshire and Jersey breeds. (Ingham.)

D. H. 108 f. *Dairy Manufacturing* (5)—Two lectures; two 4-hour laboratories. Prerequisites, D. H. 1 f and Bact. 1. (Not given in 1938-39.)

The principles and practice of making casein, cheese and butter, including a study of the physical, chemical and biological factors involved. Laboratory practice will include visits to commercial factories. (England.)

D. H. 109 s. *Dairy Manufacturing* (5)—Two lectures; two 4-hour laboratories. Prerequisites, D. H. 1 f and Bact. 1. (Not given in 1938-39.)

The principles and practice of making condensed milk and milk powder, and ice cream, including a study of the physical, chemical and biological factors involved. Laboratory practice will include visits to commercial factories. (England.)

D. H. 110 f. *Market Milk* (5)—Three lectures; two laboratories. Prerequisites, D. H. 1 f and Bact. 1.

Commercial and economic phases of market milk, with special reference to its transportation; processing, and distribution; certified milk; commercial buttermilk; milk laws; duties of milk inspectors; distribution; milk plant construction and operation. Laboratory practice includes visits to local dairies. (England.)

D. H. 111 s. *Analysis of Dairy Products* (3)—One lecture; one 4-hour laboratory (consecutive). Prerequisites, D. H. 1 f, Bact. 1, Chem. 4 f or s, Chem. 12 y.

The application of chemical and bacteriological methods to commercial dairy practice; analysis by standard chemical, bacteriological, and factory methods; standardization and composition control; tests for adulterants and preservatives. (England.)

D. H. 119 f, 120 s. *Dairy Literature* (1, 1)—One lecture. Prerequisite, D. H. 1 f and D. H. 2 s.

Presentation and discussion of current literature in dairying.

(England, Berry.)

D. H. 121 y. *Methods of Dairy Research* (1-3). Credit in accordance with the amount and character of work done.

This course is designed especially to meet the needs of those dairy students who plan to enter the research or technical field of dairying. Methods of conducting dairy research and the presentation of results are stressed. A research problem which relates specifically to the work the student is pursuing will be assigned. (England, Berry.)

Courses for Graduates

D. H. 201 f. *Advanced Dairy Production* (3).

A study of the newer discoveries in animal nutrition, breeding, and management. Readings and assignments. (Ingham.)

D. H. 202 f. *Dairy Technology* (2)—Two lectures.

A consideration of milk and dairy products from the physio-chemical point of view. (England.)

D. H. 203 s. *Milk Products* (2)—Two lectures.

An advanced consideration of the scientific and technical aspects of milk products. (England.)

D. H. 204 f or s. *Special Problems in Dairying* (1-3) Credit in accordance with the amount and character of work done.

Special problems which relate specifically to the work the student is pursuing will be assigned. (Staff.)

D. H. 205 f or s. *Seminar* (1).

Students are required to prepare papers based upon research in progress or completed for presentation before and discussion by the class. (Staff.)

D. H. 206 y. *Research*. Credit to be determined by the amount and quality of work done.

The student will be required to pursue, with the approval of the head of the department, an original investigation in some phase of dairy husbandry, carry the same to completion, and report results in the form of a thesis. (Meade, Ingham, England.)

ECONOMICS

Some of the specialized courses in the following lists may be offered only in alternate years, whenever prospective enrollments therein do not justify repeating annually. Such courses are so arranged, however, that students may include any course by election during a two-year period. Alternating courses are indicated as follows:

*Offered 1938-39. May or may not be offered in 1939-40.

†Offered 1939-40. May or may not be offered in 1938-39.

See also related courses in Business Administration and Agricultural Economics.

Courses for Graduates and Advanced Undergraduates

ECON. 130 f. *Labor Economics* (3)—Prerequisite, Econ. 52 or 57. (Equivalent to former Econ. 109 f.)

Insecurity, wages and income, hours, substandard workers, industrial conflict; wage theories; the economics of collective bargaining; unionism in its structural and functional aspects; recent developments. (Marshall.)

ECON. 131 s.† *Labor and Government* (3)—Prerequisite, Econ. 52.

A study of society's efforts through legislation to improve labor conditions. State and federal laws and court decisions affecting wages, hours,

working conditions, immigration, convict labor, union activities, industrial disputes, collective bargaining, and economic security. (Marshall.)

Econ. 133 s.* *Industrial Relations* (3)—Prerequisite, Econ. 52.

A study of the development and methods of organized groups in industry with reference to the settlement of labor disputes. An economic and legal analysis of labor union and employer association activities, arbitration, mediation, and conciliation; collective bargaining, trade agreements, strikes, boycotts, lockouts, company unions, employee representation, and injunctions. (Marshall.)

Econ. 136 s.* *Economics of Consumption* (3)—Prerequisite, Econ. 52 or 57.

The place of the consumer in our economic system. An analysis of demand for consumer goods. The need for consumer-consciousness and a technique of consumption. Cooperative and governmental agencies for consumers. Special problems. (Marshall.)

Econ. 145 s.† *Public Utilities* (3)—Prerequisite, Econ. 52 or 57.

Economic and legal characteristics of the public utility status; problems of organization, production, marketing, and finance; public regulation and alternatives. (Layton.)

Econ. 151 f.† *Theories of Economic Reform* (3)—Prerequisite, Econ. 52.

An investigation of some of the more important social reform movements and programs of the modern era. The course begins with an examination and evaluation of the capitalistic system, followed by an analysis of alternative types of economic control. (Marshall.)

Econ. 152 s.* *Social Control of Business* (3)—Prerequisite, sophomore economics and O. & M. 101 and 102 (or concurrent registration therein).

The reasons for and the methods of avoidance, escape, and abuse of competition as a regulating force in business. Social control as a substitute for, or as a modification of preservation of competition. Law as an instrument of social control through administrative law and tribunals. The constitutional aspects of social control. (Layton.)

Econ. 153 f. *Industrial Combination* (3). Prerequisite, Econ. 52. (Not offered in 1938-39.)

The development of industrial combinations in the United States; the causes which brought about the trust movement; trade and business methods employed by these combinations; types of big business; anti-trust legislation in this country and its effects.

Econ. 161 s. *Economics of Cooperative Organization* (3). Prerequisite, Mkt. 101 or 102. Finance 111. For 1938-39, concurrent registration in the prerequisites will suffice.

Analysis of the principles and practice of cooperation in economic activity from the viewpoint of effective management and public interest. Potentialities, limitations, and management problems of consumer, producer, marketing, financial, and business men's cooperatives. (Stevens.)

Econ. 191 s. *Contemporary Economic Theory* (3). Prerequisite, senior or graduate standing.

A survey of recent trends in English, American and Continental economic thought with special attention paid to the institutionalists, the welfare economists, and the mathematical economists. (Gruchy.)

Courses for Graduates

ECON. 201 f, 202 s. *Research* (1-3 each semester). Credit in proportion to work accomplished. Students must be especially qualified to pursue effectively the research to be undertaken.

Investigation or original research in problems of economics under supervision of the instructor. (Staff.)

ECON. 203 y. *Seminar* (4). Prerequisite, concurrent graduate major in economics or business administration, and consent of instructor.

Discussion of major problems in the field of economic theory, accounting, cooperation, or business (Staff.)

ECON. 205 f. *History of Economic Thought* (3).

A study of the development of economic thought and theories, including the Ancients, the Greeks, the Romans, Scholasticism, Mercantilism, Physiocrats, Adam Smith and contemporaries, Malthus, Ricardo, and John Stuart Mill. (Marshall.)

ECON. 206 s. *Economic Theory in the Nineteenth Century* (3).

A study of the various schools of economic thought, particularly the classicists, the neo-classicists, the Austrians, and the socialists. (Marshall.)

ECON. 207 y. *The Economics of Alfred Marshall* (6).

Study of the life work of the great English economist. (Not offered in 1938-39.) (Gruchy.)

ECON. 210 f, s. *Special Problems in Economic Investigation* (1-3 each semester.) Credit in proportion to work accomplished. (Not offered in 1938-39.)

Technique involved in economic research. Practice in drawing up schedules and programs. Individual conferences and reports. (Stevens.)

ECON. 233 s. *Problems in Industrial Relations* (3). Prerequisite, preliminary courses in the field of specialization, and permission of the instructor. The subjects selected for study may be closely allied with, but must not be the same as, the subject discussed in the student's major thesis. (Marshall.)

ECON. 252 s. *Problems in Government and Business Interrelations* (3). Prerequisite, preliminary courses in the field of specialization, and permission of the instructor. The subjects selected for study may be closely allied with, but must not be the same as, the subject discussed in the student's major thesis. (Layton.)

ECON. 299 f, s. *Problems in Economics of Cooperation* (1-6). Prerequisite, preliminary courses in the field of specialization, and permission of the instructor. Problems may involve practical work with the National Co-operative Council and other Washington, D. C., or Maryland cooperative organizations. The subjects selected for investigation may be closely allied with, but must not be the same as, the subject discussed in the student's major thesis. (Stevens.)

EDUCATION

A. History and Principles

Courses for Graduates and Advanced Undergraduates

ED. 101 f. *History of Education: Greco-Roman, Medieval, and Early Modern Education* (2).

A survey of the evolution in Europe of educational theory, institutions, and practices from the Greco-Roman era to 1750. (Long.)

ED. 102 s. *History of Modern Education* (2)—Continuation of Ed. 101 f.

The survey of the modern period is directed to the creators of modern education and the bases on which modern educational systems have been founded in various countries. (Long.)

ED. 103 s. *Principles of Secondary Education* (3). Prerequisites, Ed. 5 s.

Evolution of the high school; European secondary education; articulation of the high school with the elementary school, college, and technical school, and with the community and the home; the junior high school; vocational education; high school pupils; programs of study and the reconstruction of curricula; teaching staff; student activities. (Brechtbill.)

ED. 105 f. *Educational Measurements* (3). Prerequisite, consent of instructor.

A study of tests and examinations with emphasis upon their construction and use. Types of tests; purposes of testing; elementary statistical concepts, and processes used in summarizing and analyzing test results; school marks. (Brechtbill.)

ED. 107 f. *Comparative Education (Europe)* (2).

The forces that cause different systems of education, and the characteristic differences in the educational policies and practices in various countries are studied in this course. The major emphasis is upon the principal European countries. (Long.)

ED. 108 s. *Comparative Education (Latin America)* (2).

The method of this course is similar to that of Ed. 107 f, the content being the education of the Latin area of the New World. (Long.)

ED. 110 f. *The Junior High School* (2).

This course considers the functions of the junior high school in the American public school system. Its development, present organization, curricula, and relation to upper and lower grades will be emphasized.

ED. 111 f. *Lives of Scientists* (2).

A study of the major achievements and interesting incidents in the lives of the pioneers of science. Though designed especially to provide enrichment material for the use of high school teachers, the course is of general cultural value. (Brechtbill.)

ED. 115 A f and B s. *Seminar in Course of Study Construction* (2-3 each semester).

A course for advanced students, teachers, and supervisors in the prin-

ciples and procedures of curriculum making. Each student deals with some individual problem in curriculum making, e. g., units for science, the social studies, English, etc.

The course is adjusted to individual needs, with class periods for the discussion of general principles and procedures, and separate laboratory periods arranged by the instructor. (M. Smith.)

Ed. 193 f. *Visual Education* (2).

Visual impressions in their relation to learning; investigations into the effectiveness of instruction by visual means; projection apparatus, its cost and operations; slides, film strips, and films; physical principles underlying projection; the integration of visual materials with organized courses of study; means of utilizing commercial moving pictures as an aid in realizing the aims of the school. (Brechtbill.)

See also "Agricultural Education and Rural Life."

Courses for Graduates

Ed. 200 f. *Organization and Administration of Public Education* (3).

This course deals objectively with the organization, administration, curricula, and present status of public education in the United States. (Small.)

Ed. 201 s. *Educational Interpretations* (3).

In this course a study is made of the social, economic, political, and cultural environment in which American educational institutions and policies have developed, and of the function of education in environmental change. (Small.)

Ed. 204 s. *High School Administration and Supervision* (3).

This course will consider the principal's duties in relation to organization for operation, administration and supervision of instruction, and community relationships.

Ed. 206 s. *History of American Education to 1850* (2).

The development of the public school in America up to 1850. (Long.)

Ed. 215 y. *Seminar in Secondary Education* (4-6). (The first semester's work may receive credit whether or not the course is carried the second semester.)

A study of pressing problems with which secondary education is faced at the present time.

Ed. 250 y. *Seminar in Education* (2-4).

Required of all candidates for the Master's degree whose majors are in the field of education. (Staff.)

See also "Agricultural Education and Rural Life."

B. Educational Psychology

See "Psychology."

C. Methods in High School Subjects

Courses for Graduates and Advanced Undergraduates

Graduate credit for courses in this section will be given only by special permission of the Department of Education.

ED. 120 s. *English in the High School* (2)—Prerequisite, Psych. 10 f or s.

Objectives in English in the different types of high schools; selection and organization of subject-matter in terms of modern practice and group needs; evaluation of texts and references; bibliographies; methods of procedure and types of lessons; the use of auxiliary materials; lesson plans; measuring results. (Smith.)

ED. 122 s. *The School Studies in the High School* (2)—Prerequisite, Psych. 10 f or s.

Selection and organization of subject-matter in relation to the objectives and present trends in the social studies; texts and bibliographies; methods of procedure and types of lessons; the use of auxiliary materials; lesson plans; measuring results.

ED. 124 s. *Modern Language in the High School* (2)—Prerequisite, Psych. 10 f or s.

Objectives of modern language teaching in the high school; selection and organization of subject-matter in relation to modern practices and group needs; evaluation of texts and references; bibliographies; methods of procedure and types of lessons; lesson plans; special devices, measuring results.

ED. 126 s. *Science in the High School* (2)—Prerequisite, Psych. 10 f or s.

Objectives of science teaching; their relation to the general objectives and secondary education; application of the principles of psychology and of teaching to the science class room situation; selection and organization of subject-matter; history, trends, and status; textbooks, reference works, and laboratory equipment; technique of class room and laboratory; measurement, standardized tests; professional organizations and literature.

(Breechbill.)

ED. 128 s. *Mathematics in the High School* (2)—Prerequisite, Psych. 10 f or s.

Objectives; the place of mathematics in secondary education; content and construction of courses; recent trends; textbooks and equipment; methods of instruction, measurements and standardized tests; professional organizations and literature.

(Breechbill.)

ED. 130 f. *High School Course of Study—Composition* (2).

Content and organization of the materials of written and oral composition in the several high school grades. (Smith.)

ED. 131 s. *High School Course of Study—Literature* (2).

Content and organization of the literature course in the several high school grades. (Smith.)

ED. 135 f. *High School Course of Study—Geometry* (2).

Content and organization of intuitive and demonstrative geometry. Methods of analysis and problem solving. (Breechbill.)

Ed. 136 f. *High School Course of Study—Biology* (2).

Content and organization of biology.

(Brechbill.)

Ed. 137 s. *High School Course of Study—Physical Science* (2).

Content and organization of physics. Some consideration is given to content of chemistry.

(Brechbill.)

Ed. 138 f. *High School Course of Study—Social Studies* (2).

Content and organization of the materials of the social studies in the several high school grades.

Ed. 139 f or s. *Supervised Teaching of High School Subjects* (2).

Observation and supervised teaching.

A minimum of 20 periods.

(Staff.)

D. Home Economics Education

Courses for Graduates and Advanced Undergraduates

H. E. Ed. 105 f or s. *Special Problems, Child Study* (4). (McNaughton.)

Courses for Graduates

H. E. Ed. 201 f or s. *Advanced Methods of Teaching Home Economics* (2-4).

Study of social trends as applied to the teaching of home economics.

(McNaughton.)

H. E. Ed. 250 y. *Seminar in Home Economics Education* (2-4), (See Ed. 250 y.)

(McNaughton.)

ENGLISH LANGUAGE AND LITERATURE

Courses for Graduates and Advanced Undergraduates

ENG. 100 f. and s. *Advanced Composition* (2)—Two lectures. Prerequisites, Eng. 1 y and Eng. 2 f and 3 s. Course complete in one semester, but may be taken a second semester for credit.

Theory and practice in the larger forms, the types to be varied each semester at the election of the class.

ENG. 101 s. *History of the English Language* (3)—Three lectures. Prerequisite, Eng. 14 f.

An historical survey of the English language; its nature, origin and development, with special stress upon structural and phonetic changes in English speech and upon the rules which govern modern usage. (Harman.)

ENG. 102 f. *Anglo-Saxon* (3)—Three lectures. Prerequisite, Eng. 14 f.

A study of Anglo-Saxon (Old English) grammar and literature. Lectures on the principles of phonetics and comparative philology.

(House.)

ENG. 103 s. *Beowulf* (3)—Three lectures. Prerequisite, Eng. 102 f.

A study of the Old English epic in the original. Stress on philology, syntax, versification.

(House.)

ENG. 104 f. *Chaucer* (3)—Three lectures. Prerequisite, Eng. 1 y and Eng. 2 f and 3 s.

A study of the *Canterbury Tales*, *Troilus and Criseyde*, and the principal minor poems, with lectures and readings on the social background of Chaucer's time. (Hale.)

ENG. 105 f. *Medieval Drama in England* (3)—Three lectures. Prerequisites, Eng. 1 y and Eng. 2 f and 3 s. (Not given in 1938-39.)

A study of the development of medieval English drama from its beginning to 1540. Class discussion of significant plays, outside reading, reports. (Fitzhugh.)

ENG. 106 s. *Elizabethan Drama* (3)—Three lectures. Prerequisite, Eng. 1 y and Eng. 2 f and 3 s. (Not given in 1938-1939.)

A study of the change in spirit and form of English drama from 1540 to 1640, as seen in the works of the important dramatists other than Shakespeare. Class discussion of significant plays, outside reading, reports. (Zeeveld.)

ENG. 107 s. *Elizabethan Non-Dramatic Literature* (3)—Three lectures. Prerequisites, Eng. 2 f and 3 s.

Survey of the non-dramatic poetry and prose from 1557 to 1600, with emphasis upon the sonnet cycle, the epic, and the beginnings of fiction. (Zeeveld.)

ENG. 108 f. *Milton* (2)—Two lectures. Prerequisites, Eng. 1 y and Eng. 2 f and 3 s.

A study of the poetry and the chief prose works. (Murphy.)

ENG. 109 f. *Literature of the Seventeenth Century to 1660* (2)—Two lectures. Prerequisites, Eng. 1 y and Eng. 2 f and 3 s. (Not given in 1938-1939.)

A study of the chief prose writers and of the Metaphysical and Cavalier traditions in poetry. (Murphy.)

ENG. 110 s. *The Age of Dryden* (2)—Two lectures. Prerequisites, Eng. 1 y and Eng. 2 f and 3 s. (Not given in 1938-1939.)

This course emphasizes the relation of literature to the philosophical movements of the age. (Murphy.)

ENG. 111 f. *Literature of the Eighteenth Century* (2)—Two lectures. Prerequisites, Eng. 1 y and Eng. 2 f and 3 s.

Readings in the period dominated by Defoe, Swift, Addison, Steele, and Pope. (Fitzhugh.)

ENG. 112 s. *Literature of the Eighteenth Century* (2)—Two lectures. Prerequisites, Eng. 1 y and Eng. 2 f and 3 s.

A continuation of Eng. 111 f. Dr. Johnson and his Circle; the Rise of Romanticism; the Letter Writers. (Fitzhugh.)

ENG. 113 f. *Prose and Poetry of the Romantic Age* (3)—Three lectures. Prerequisites, Eng. 1 y and Eng. 2 f and 3 s.

A study of the development of the Romantic movement in England as exemplified by the prose and poetry of Wordsworth, Coleridge, Lamb, De Quincey, Landor, and others.

ENG. 114 s. *Prose and Poetry of the Romantic Age* (3)—Three lectures. Prerequisites, Eng. 1 y and Eng. 2 f and 3 s.

A study of the later Romantic writers, including Byron, Shelley, Keats, Moore, Scott, and others. (Hale.)

ENG. 115 f. *Scottish Poetry* (2)—Two lectures. Prerequisites, Eng. 1 y and Eng. 2 f and 3 s. No knowledge of the Scottish dialect required. (Not given in 1938-1939.)

Readings in the Scottish Chaucerians; Drummond of Hawthornden; song and ballad literature; poets of the vernacular revival: Ramsay, Ferguson, and Burns. Papers and reports. (Fitzhugh.)

ENG. 116 f. *Tennyson and Browning* (3)—Three lectures. Prerequisites, Eng. 1 y and Eng. 2 f and 3 s.

Wide reading of the poems with detailed study of selected pieces. (House.)

ENG. 117 f. *Minor Victorian Poets* (3)—Three lectures. Prerequisites, Eng. 1 y and Eng. 2 f and 3 s. Arnold, Clough, Thompson, Swinburne, and others. (House.)

ENG. 118 s. *Modern and Contemporary British Poets* (3)—Three lectures. Hardy, Kipling, Bridges, Noyes, Masfield, and others. (House.)

ENG. 120 f. *The English Novel* (2)—Two lectures. Prerequisites, Eng. 1 y and Eng. 2 f and 3 s.

Prose fiction in England from the later seventeenth century to the middle of the nineteenth. Lectures on the principles of narrative themes, structure, and style. Class reviews of selected novels. (House.)

ENG. 121 s. *The English Novel* (2)—Two lectures. Prerequisites, Eng. 1 y and Eng. 2 f and 3 s.

Continuation of Eng. 120 f. Discussion of later nineteenth century and twentieth century English fiction. (House.)

ENG. 123 f. *Modern Drama* (3)—Three lectures, Prerequisites, Eng. 1 y and Eng. 2 f and 3 s.

A survey of English drama during the two centuries from 1660 to 1860. Class discussion of significant plays, outside reading, reports. (Fitzhugh.)

ENG. 124 s. *Contemporary Drama* (3)—Three lectures. Prerequisites, Eng. 1 y and Eng. 2 f and 3 s.

A study of significant European and American dramatists from Ibsen to O'Neill. Class discussion of significant plays, outside reading, reports. (Fitzhugh.)

ENG. 125 f. *Emerson, Thoreau, and Whitman* (3)—Three lectures. Prerequisites, Eng. 7 f and 8 s. (Not given in 1938-1939.)

A study of the major writings of Emerson, Thoreau, and Whitman, with emphasis on transcendentalism, idealism, and democracy. (Warfel.)

ENG. 126 s. *American Fiction* (3)—Three lectures. Prerequisites, Eng. 7 f and 8 s. (Not given in 1938-1939.)

Historical and critical study of the short story and novel in the United States from 1789 to 1920. (Warfel.)

ENG. 127 f. *Contemporary American Poetry and Prose* (3)—Three lectures. Prerequisites, Eng. 7 f and 8 s.

Tendencies and forms in non-dramatic literature since 1920. (Warfel.)

ENG. 128 s. *American Drama* (3)—Three lectures. Prerequisites, Eng. 7 f and 8 s.

Historical study of representative American plays and playwrights from 1787 to 1920. (Warfel.)

Courses for Graduates

ENG. 201. *Research* (2-4)—Credit proportioned to the amount of work and ends accomplished.

Original research and the preparation of dissertations looking towards advanced degrees. (Staff.)

ENG. 202 s. *Browning's The Ring and the Book* (2)—Two lectures. (Not given in 1938-1939.)

A study of the text, the sources, and the criticism. (House.)

ENG. 203 f. *Middle English Language* (2)—Two lectures. Prerequisites, Eng. 102 f and 103 s.

A study of readings of the Middle English period, with reference to etymology and syntax. (House.)

ENG. 204 s. *Gothic* (2)—Two lectures. Prerequisites, Eng. 102 f and 103 s.

A study of the forms and syntax, with readings from the *Ulúlas Bible*. Correlation of Gothic speech sounds with those of Old English. (House.)

ENG. 205 s. *Browning's Dramas* (2)—Two lectures.

Luria, The Return of the Druses, Pippa Passes, Colombe's Birthday, A Blot in the 'Scutcheon, and others. (House.)

ENG. 206 f. *Shakespeare Seminar* (2)—Two lectures. Prerequisites, Eng. 11 f and Eng. 12 s.

A survey of Shakespeare's complete works, with special attention to major problems in Shakespeare. (Zeeveld.)

ENG. 207 y. *Medieval Romance in England* (4)—Two lectures.

Lectures and readings in the cyclical and non-cyclical romances in Medieval England, and their sources, including translations from the Old French. (Hale.)

ENG. 208 s. *Seminar in Eighteenth Century Literature* (2)—Two lectures. (Not given in 1938-1939.)

Intensive study of one man's work or of one important movement of the century. (Fitzhugh.)

ENG. 209 y. *Seminar in American Literature* (4)—Two lectures.

Critical and biographical problems in nineteenth-century American Literature. The subject for 1938-1939 will be *Charles Brockden Brown and His Circle*. (Warfel.)

ENG. 210 f. *Seminar in the Romantic Period* (2)—Two lectures. Prerequisites, Eng. 113 f and 114 s, or an equivalent satisfactory to the instructor. One discussion period of two hours.

Special studies of problems or persons associated with the Romantic movement. The subject-matter of the course will vary with the interests of the class. (Hale.)

ENG. 211 s. *Victorian Prose* (2)—Two lectures.

English prose from about 1830. Study devoted chiefly to Carlyle, Mill, Arnold, Ruskin. (House.)

ENTOMOLOGY

Courses for Graduates and Advanced Undergraduates

ENT. 101 y. *Economic Entomology* (4)—Two lectures.

An intensive study of the problems of applied entomology, including life history, ecology, behavior, distribution, parasitism, and control. (Cory.)

ENT. 102 y. *Economic Entomology* (4)—Two laboratories. (Not offered in 1938-1939.)

Expansion of Ent. 101 y to include laboratory and field work in economic entomology. (Cory.)

ENT. 103 y. *Seminar* (2).

Presentation of original work, book reviews, and abstracts of the more important literature. (Cory, Knight.)

ENT. 104 f and s. *Insect Pests of Special Groups* (6)—Two lectures; one laboratory. Prerequisite, Ent. 1 f or s. (Not offered in 1938-1939.)

A study of the principal insect pests of one or more of the following groups, founded upon food preferences and habitat. The course is intended to give the general student a comprehensive view of the insects that are of importance in his major field of interest, and detailed information to the student specializing in entomology.

Insect Pests of: 1. Fruit; 2. Vegetables; 3. Flowers, both in the open and under glass; 4. Ornamental and shade trees; 5. Forests; 6. Field crops; 7. Stored products; 8. Live stock; 9. The household. (Cory.)

ENT. 105 f. *Medical Entomology* (2)—Two lectures. Prerequisite, Ent. 1 f or s. and consent of instructor.

The relation of insects to diseases of man, directly and as carriers of pathogenic organisms. Control of pests of man. The fundamentals of parasitology. (Knight.)

ENT. 106 s. *Insect Taxonomy* (3)—Two lectures; one laboratory.

An advanced course dealing with the principles and practices underlying modern systematic entomology. (Hyslop.)

ENT. 107 s. *Theory of Insecticides* (2)—Two lectures.

The development and use of contact and stomach poisons, with regard to their chemistry, toxic action, compatibility, and foliage injury. Recent work with insecticides will be especially emphasized. (Ditman.)

ENT. 109 s. *Insect Physiology* (2)—Two lectures; occasional demonstrations. Enrollment subject to consent of instructor.

The functioning of the insect body with particular reference to blood,

circulation, digestion, absorption, respiration, reflex action and the nervous system, metabolism, and excretion. (Yeager.)

EXT. 110 f or s. *Special Problems*. Credit and prerequisite to be determined by the staff.

The intensive investigation of some entomological subject.

(Cory and Staff.)

EXT. 111 s. *Coccidology* (2)—Two laboratories.

A study of morphology, taxonomy, and biology of the higher groups of the scale insects. The technique of preparation and microscopy are emphasized. Laboratory studies are supplemented by occasional lectures.

(McConnell.)

Courses for Graduates

EXT. 201. *Advanced Entomology* (1-3).

Studies of minor problems in morphology, taxonomy, and applied entomology, with particular reference to preparation for individual research.

(Cory.)

EXT. 202 y. *Research in Entomology*.

Advanced students having sufficient preparation, with approval of the head of the department, may undertake supervised research in morphology, taxonomy, or biology and control of insects. Frequently the students may be allowed to work on Station or State Horticultural Department projects. The student's work may form a part of the final report on the project and be published in bulletin form. A dissertation, suitable for publication, must be submitted at the close of the studies as a part of the requirements for an advanced degree.

(Cory.)

EXT. 203 f. *Insect Morphology* (2-4)—Two lectures, and laboratory work by special arrangement, to suit individual needs.

Insect anatomy with special relation to function. Given particularly in preparation for work in physiology and other advanced studies.

(Snodgrass.)

EXT. 204 y. *Economic Entomology* (6)—Three lectures.

Studies of the principles underlying applied entomology, and the most significant advances in all phases of entomology.

(Cory.)

EXT. 205 s. *Insect Ecology* (2)—One lecture; one laboratory.

A study of the fundamental factors involved in the relationship of insects to their environment. Emphasis is placed on the insect as a dynamic organism adjusted to the environment.

(Langford.)

GENETICS AND STATISTICS

Courses for Graduates and Advanced Undergraduates

G. & S. 101 f. *Genetics* (3)—Three lectures.

A general course designed to give an insight into the principles of genetics or of heredity, and also to prepare students for later courses in the breeding of animals or of plants.

(Kemp.)

G. & S. 102 s. *Advanced Genetics* (2)—Two lectures. Prerequisite, G. & S. 101 f. Alternate year course.

A consideration of chromosome irregularities and other mutations, identity and nature of the gene, inter-species crosses, genetic equilibrium, statistical significance of genetic phenomena. (Kemp.)

G. & S. 111 f. *Statistics* (2)—Two lectures.

A study of the collection, analysis, interpretation, and presentation of statistics. The course includes a study of expressions of type, variability, correlation and regression, error and significance of differences. (Kemp.)

G. & S. 112 s. *Advanced Statistics* (2)—Two lectures. Prerequisite, G. & S. 111 f or its equivalent.

A study of the theory of error, measures of relationship, multiple and partial correlation, predictive formulas, curve fitting and an introduction to analysis of variance. (Kemp.)

Courses for Graduates

G. & S. 201 y. *Crop Breeding*—Credit determined by work accomplished. (Kemp.)

G. & S. 209 y. *Research*—Credit determined by work accomplished. (Kemp.)

HISTORY

Courses for Graduates and Advanced Undergraduates

H. 101 y. *American Colonial History* ((6)—Three lectures. Prerequisite, H. 2 y.

A study of the political, social, and economic development of the American people from the discovery of America through the formation of the Constitution. (Crothers.)

H. 102 y. *Recent American History* (6)—Three lectures. Prerequisite, H. 2 y.

The history of national development from the close of the Civil War to the present time. (Thatcher.)

H. 104 f. *Social and Economic History of the United States* (3)—Three lectures. Prerequisite, H. 2 y.

An advanced course giving a synthesis of American life from 1607 to 1790. (Crothers.)

H. 105 s. *Social and Economic History of the United States* (3)—Three lectures. Prerequisite, H 2 y.

This course is similar to H. 104 f, and covers the period from 1790 to 1860. (Crothers.)

H. 106 f, 107 s. *Diplomatic History of the United States* (2-2)—Two lectures. Prerequisite, H. 2 y.

A study of American foreign policy. (Thatcher.)

H. 108 f, 109 s. *Constitutional History of the United States* (3-3)—Three lectures. Prerequisite, H. 2 y.

A study of the historical forces resulting in the formation of the Constitution and of the development of American constitutionalism in theory and practice thereafter. (Thatcher.)

H. 110 f, 111 s. *History of the United States, 1790-1865* (2-2)—Two lectures. Prerequisite, H. 2 y.

The history of national development to the end of the Civil War. (Thatcher.)

Hist. 112 f, 113 s. *History of Maryland* (2-2)—Two lectures. Prerequisite H. 2 y.

A survey of the political, economic and social progress of Maryland as colony and state. (Dozer.)

H. 115 f. *Medieval History* (2)—Two lectures. Prerequisite, H. 1 y.

A brief survey of the medieval period with special emphasis on the legacy of the Middle Ages. (Prange.)

H. 117 s. *Renaissance and Reformation* (2)—Two lectures. Prerequisite, H. 1 y.

A brief survey of the Renaissance and Reformation. (Prange.)

H. 119 f. *Seventeenth and Eighteenth Century Europe* (2)—Two lectures. Prerequisite, H. 1 y or H. 3 y.

A study of the political, economic, social and intellectual ferment of the "Age of Reason." (Silver.)

H. 120 s. *Revolutionary and Napoleonic Europe* (2)—Two lectures. Prerequisite, H. 1 y or H. 3 y.

A study of the French Revolution and the relation of Revolutionary France with the rest of Europe, 1789-1815. (Silver.)

H. 121 f, 122 s. *Expansion of Europe* (3-3)—Three lectures. Prerequisite, H. 1 y.

A treatment of European history from the Crusades to the present, emphasizing especially the expansion of national states. (Silver.)

H. 123 f, 124 s. *Diplomatic History of Europe since 1871* (3-3)—Three lectures. Prerequisite, H. 1 y. (Not given in 1938-1939.)

A study of European alliances and alignments. World politics and imperialism in the pre-World War period, and developments since the World War. (Strakhovsky.)

H. 125 f, 126 s. *Constitutional History of England* (3-3)—Three lectures. Prerequisite, H. 1 y or H. 3 y.

This course traces the historical development of English political institutions. (Silver.)

H. 127 f, 128 s. *Europe Since 1915* (3-3)—Three lectures. Prerequisite, H. 1 y.

An intensive course in European history from 1815 to the present time. (Strakhovsky.)

H. 129 f, 130 s. *Ancient History* (2,2)—Two lectures.

A general summary course—The Near East, Greece, and Rome.

(Highby.)

Courses for Graduates

H. 200. *Research* (2-4). Credit proportioned to the amount of work.

(Staff.)

H. 201 y. *Seminar in American History* (4)—Conferences and reports on related topics.

(Crothers.)

H. 202. *Bibliography and Historical Criticism* (4).

(Staff.)

HOME ECONOMICS

Foods and Nutrition

Courses for Graduates and Advanced Undergraduates

H. E. 131 f. *Nutrition* (3)—Three recitations. Prerequisites, H. E. 31 y and Elements of Organic Chemistry (Chem. 12 A y).

A scientific study of principles of human nutrition.

(Welsh.)

H. E. 132 s. *Dietetics* (3)—Three recitations. Prerequisite, H. E. 131 f. A study of food selection for health and its adaptations in disease.

H. E. 133 f. *Demonstrations* (2)—Two laboratories.

Practice in demonstrations.

(Welsh and Barnes.)

H. E. 134 s. *Advanced Foods* (3)—One recitation; two laboratories. Prerequisite, H. E. 31 y.

Advanced study of manipulation of food material.

(Welsh.)

H. E. 135 f. *Experimental Foods* (4)—Two recitations; two laboratories. Prerequisites, H. E. 31 y, H. E. 137 s, Chem. 12 A y.

Study of experimental procedures and technics in jelly making, vegetable cookery, emulsions, and batters and doughs.

(Kirkpatrick.)

H. E. 136 s. *Child Nutrition* (2)—Two recitations.

Lectures, discussions and field trips relating to the principles of child nutrition.

(Welsh.)

Courses for Graduates

H. E. 201 f or s. *Seminar in Nutrition* (2).

Oral and written reports on current literature of nutrition.

(Staff.)

H. E. 202 f or s. *Research*. Credits to be determined by amount and quality of work done.

With the approval of the head of the department, students may pursue an original investigation in some phase of foods. The results may form the basis of a thesis for an advanced degree.

(Welsh.)

H. E. 203 f or s. *Advanced Experimental Foods* (3)—One recitation; two laboratories.

(Kirkpatrick.)

H. E. 204 f. *Readings in Nutrition* (2).

Reports and discussions of outstanding nutritional research and investigations.

(Staff.)

HORTICULTURE

Courses for Graduates and Advanced Undergraduates

HORT. 101 f. 102 s. *Technology of Horticultural Plants* (1, 3, or 4 each semester)—One or three lectures; one laboratory.

A critical analysis of detailed studies on horticultural plants in relation to application to practice. An interpretation of horticultural knowledge, based on principles of physiology, chemistry, and other sciences. A study of underlying principles involved in growth, fruiting, storage and quality of horticultural plants and products. (Haut, Mahoney.)

HORT. 103 f. *Systematic Pomology* (3)—Two lectures; one laboratory. (Given in alternate years; not offered in 1939-1940.)

The history, botany, and classification of fruits and their adaptation to Maryland conditions. (Haut.)

HORT. 104 s. *Systematic Olericulture* (3)—Two lectures; one laboratory. (Given in alternate years; not offered in 1939-1940.)

A study of the classification and nomenclature of vegetable crops and the description and identification of varieties. The adaptation of varieties to different environmental conditions and their special uses in vegetable production. (Mahoney.)

HORT. 105 s. *World Fruits and Nuts* (2)—Two lectures. (Given in alternate years; not offered in 1938-1939.)

A study is made of the botanical, ecological, and physiological characteristics of all species of fruit-bearing plants of economic importance, such as the date, pineapple, fig, olive, banana, nut-bearing trees, citrus fruits, and newly introduced fruits with special reference to their cultural requirements in certain parts of the United States and the insular possessions. All fruits are discussed in this course which have not been discussed in a previous course. (Haut.)

HORT. 106 y. *Plant Materials* (5)—One lecture; one or two laboratories. (Given in alternate years; not offered in 1938-1939.)

A field and laboratory study of trees, shrubs, and vines used in ornamental planting. (Thurston.)

Courses for Graduates

HORT. 201 y. *Experimental Pomology* (6)—Three lectures.

A systematic study of the sources of knowledge and opinion as to practices in pomology; methods and difficulties in experimental work in pomology and results of experiments that have been or are being conducted in all experiment stations in this and other countries. (Schrader.)

HORT. 202 y. *Experimental Olericulture* (6)—Three lectures.

A systematic study of the sources of knowledge and opinion as to practices in vegetable growing; methods and difficulties in experimental work in vegetable production and results of experiments that have been or are being conducted in all experiment stations in this and other countries. (Mahoney.)

HORT. 204 s. *Methods of Research* (2)—One lecture; one laboratory.

Special drill will be given in the making of briefs and outlines of research problems, in methods of procedure in conducting investigational work, and in the preparation of bulletins and reports. A study of the origin, development, and growth of horticultural research is taken up. A study of the research problems being conducted by the Department of Horticulture will be made, and students will be required to take notes on some of the experimental work in the field and become familiar with the manner of filing and cataloging all experimental work. (Staff.)

HORT. 205 y. *Advanced Horticultural Research* (4, 6 or 8).

Graduate students will be required to select problems for original research in pomology, vegetable gardening, floriculture, or landscape gardening. These problems will be continued until completed, and final results will be published in the form of a thesis. (Staff.)

HORT. 206 y. *Advanced Horticultural Seminar* (2).

This course will be required of all graduate students. Students will be required to give reports either on special topics assigned them, or on the progress of their work being done in courses. Members of the departmental staff will report special research work from time to time. (Staff.)

MATHEMATICS

Courses for Graduates and Advanced Undergraduates

MATH. 112 s. *College Mathematics* (2)—Two lectures. Prerequisite, Math. 111 f or S f, or equivalent courses.

A survey course of algebra, trigonometry, analytic geometry, and the calculus, intended for workers in the biological sciences and for prospective teachers of mathematics and physics. (Dantzig.)

MATH. 114 f. *Differential Equations for Engineers* (3)—Three lectures.

This course is conducted in close cooperation with the College of Engineering, and deals with aspects of mathematics which arise in engineering theory and practice. Among the topics treated are the following: linear differential equations; advanced methods in kinematics and dynamics; applications of analysis to electrical circuits, aero-dynamics, bridge-design, etc. (Dantzig, Yates.)

MATH. 115 s. *Applied Calculus for Chemists* (3)—Three lectures. Prerequisite, Math. 16 y.

This course is conducted in close co-operation with the Chemistry Department, and deals with the aspects of mathematics which arise in the theory and practice of chemistry. Among the topics treated are the following: partial and total derivatives, applications of mathematical analysis to thermo-dynamics, to molecular and atomic phenomena, and to physical chemistry. (Yates.)

MATH. 122 s. *History of Elementary Mathematics* (2)—Two lectures.

History of arithmetic, algebra and geometry. (Dantzig.)

MATH. 131 s. *Analytical Mechanics* (2)—Two lectures. Prerequisite, Math. 23 y.

Kinematics; the dynamics of a particle; statics; the principles of D'Alembert; the dynamics of a system; the equations of Lagrange and Jacoby; the principle of Hamilton. (Yates.)

MATH. 132 f. *Theory of Probabilities* (2)—Two lectures. Prerequisite, Math. 23 y.

Frequency and probability; the concept of "equal likely"; combinatorial analysis; addition and multiplication theorems; frequency of distribution; continuous probabilities; applications to statistics, theories of errors and correlations, and to molecular theories. (Titt.)

MATH. 140 y. *Undergraduate Seminar* (2)—One session.

Required of students who major in mathematics. This course is intended as a clearing house of problems which arise in the undergraduate courses in mathematics. (Dantzig, Yates, Titt, Lancaster.)

MATH. 141 f. *Higher Algebra* (2)—Two lectures. Prerequisite, Math. 23 y.

Identities. Multinomial expansion. Combinatorial analysis. Mathematical induction. Undetermined coefficients. Determinants. Elementary theory of equations. Complex magnitudes. (Yates.)

MATH. 142 s. *Higher Algebra* (2)—Two lectures. Prerequisite, Math. 141 f or its equivalent.

Inequalities. Continued fractions. Summation of series. Difference equations. Theory of numbers. Diophantine equations. (Yates.)

MATH. 143 f. *Advanced Calculus* (2)—Two lectures. Prerequisite, Math. 23 y.

General methods of integration. Multiple integration with physical applications. Partial differentiation. Geometrical and physical applications. Mean value theorem. Jacobians. Envelopes. (Martin.)

MATH. 144 s. *Advanced Calculus* (2)—Two lectures. Prerequisite, Math. 143 s or its equivalent.

Elliptic integrals. Line integrals. Green's theorem. Equation of continuity. Applications to hydrodynamics. (Martin.)

MATH. 145 f. *Advanced Plane Analytic Geometry* (2)—Two lectures. Prerequisite, Math. 23 y.

Homogeneous Coordinates. Advanced theory of conic sections. Plucker characters of algebraic curves. Cubic and quartic curves. Cremona transformations. (Dantzig.)

MATH. 146 s. *Solid Analytic Geometry* (2)—Two lectures. Prerequisite, Math. 145 f or its equivalent.

General theory of quadric surfaces. The twisted cubic. Line geometry. Geometry on a sphere. Cubic and quartic surfaces. (Alrich.)

MATH. 151 f. *Theory of Equations* (2)—Two lectures. Prerequisite, 142 s or its equivalent.

Complex number. Fundamental theorem of Algebra. Equations of the third and fourth degree. Algebraic solution of equations. Finite groups. Numerical solution of equations. Criteria of irreducibility. Cyclometric equations. (Lancaster.)

MATH. 152 s. *Introduction to Modern Algebra* (2)—Two lectures. Prerequisite, Math. 141 f and 142 s or their equivalents.

Vectors. Matrices. Linear dependence. Quadratic forms. Infinite groups. (Titt.)

MATH. 153 f. *Differential Equations* (2)—Two lectures. Prerequisite, Math. 144 s or its equivalent.

Equation of the first order. Linear equations with constant and variable coefficients. Change of variables. Singular solutions. Solution in series. Numerical integration. Ordinary differential equations in three variables. Partial differential equations. (Lancaster.)

MATH. 154 s. *Topics in Analysis* (2)—Two lectures. Prerequisite, Math. 153 f.

Theory of vibrations. Fourier series. Calculus of variations. Entropy. Improper integrals. (Titt.)

MATH. 155 f. *Introduction to Projective Geometry* (2)—Two lectures. Prerequisite, Math. 145 f or its equivalent.

The theorems of Desargues and Pappus. Cross-ratio and homography. Projective theory of conics. Projective interpretation and generalization of elementary geometry. (Dantzig.)

MATH. 156 s. *Introduction to Differential Geometry* (2)—Two lectures. Prerequisite Math. 23 y.

Infinitesimal properties of plane curves. Transformation. Orthogonal trajectories. Envelops. Roulettes and Glisettes. Curvilinear coordinates in the plane. (Dantzig.)

MATH. 157 s. *History of Modern Mathematics* (2)—Two lectures. Prerequisite, Math. 23 y, or its equivalent.

This course will begin with a comprehensive treatment of the history of mathematics during the seventeenth and eighteenth centuries. The development of mathematics during the nineteenth and our own centuries will be treated topically, with special emphasis on such topics as projective and non-Euclidean geometry, theory of aggregates, vector analysis, theory of groups, theory of numbers, etc. (Dantzig.)

Courses for Graduates

MATH. 221 f. *Theory of Functioning of a Complex Variable* (2)—Two lectures. Prerequisites, Math. 143 f and 144 s, or their equivalent.

Cauchy-Riemann equations; power series and infinite products; conformal mapping; the Cauchy integral theorem, residues and periods, analytic continuation. (Martin.)

MATH. 222 f. *Theory of Functions of a Real Variable* (2)—Two lectures. Prerequisites, Math. 143 f and 144 s, or their equivalent.

Real numbers, continuous functions, implicit functions, Riemannian integration, real analytic functions. (Martin.)

MATH. 223 s. *Vector Analysis* (2)—Two lectures. Prerequisite, Math. 152 s, or its equivalent.

Scalars, vectors, matrices and determinants; transformations; linear dependence, canonical forms; elementary divisors; applications to geometry and mechanics. (Alrich.)

MATH. 225 f. *Projective Geometry* (2)—Two lectures. Prerequisite Math. 155 f, or its equivalent.

Axiomatic development of geometry. Fundamental theorem. Projective equivalence. The group of collineations in the plane and in space. Non-Euclidean geometries. (Dantzig.)

MATH. 226 s. *Differential Geometry* (2)—Two lectures. Prerequisite, Math. 156 s, or its equivalent.

Principles of Vector Analysis. Skew curves. Kinematical applications. Geometry on a surface. General theory of surfaces. Curvature and space structure. Riemannian geometries. (Dantzig.)

MATH. 227 s. *Infinite Processes* (2)—Two lectures. Prerequisite, Math. 222 f, or its equivalent.

Convergence of infinite series and products. Fourier series, arthogonal functions, asymptotic series. (Lancaster.)

MATH. 228 s. *Elliptic Functions* (2)—Two lectures. Prerequisite, Math. 22 f, or its equivalent.

The theories of Legendre and Jacoby; the Weierstrass theory; doubly periodic functions; elliptic integrals; applications to algebra, geometry, and mechanics. (Martin.)

MATH. 231 s. *Partial Differential Equations with Applications to Mathematical Physics* (2)—Two lectures. Prerequisites, Math. 143 f, Math. 144 s, and Math. 153 f, or their equivalent.

Partial differential equations of the first and second order; linear equations; total differential equations; equations of the Monge-Ampere type; the Laplace equation; harmonics; applications to electricity, heat, elasticity, and hydrodynamics; potential theory. (Titt.)

MATH. 235 s. *Modern Algebra* (2)—Two lectures. Prerequisite, Math. 152 s, or its equivalent.

Sets, classes, groups, isomorphism, rings, fields, Galois theory, ordered and well-ordered sets, ideals, linear algebras. (Dantzig.)

MATH. 240 y. *Graduate Seminar* (2)—One session.

Required of all graduate students. Intended as a clearing house of problems arising in the graduate courses. Reports on progress on dissertations and a critical discussion of results achieved.

(Dantzig, Yates, Martin, Titt, Alrich, Lancaster.)

Selected Topics Courses

In addition to the preceding, a number of courses will be offered from time to time by the various members of the staff in their respective fields of specialization. These courses are intended primarily for candidates for an advanced degree, and aim at developing materials for dissertations; however, they will be open to any qualified student.

Selected Topics in Modern Geometry. (Dantzig, Alrich.)

Selected Topics in Modern Analysis. (Martin, Lancaster.)

Selected Topics in Dynamics. (Martin.)

Selected Topics in Mathematical Physics. (Titt.)

Selected Topics in Applied Mathematics. (Yates.)

MODERN LANGUAGES

A. French

Courses for Graduates and Advanced Undergraduates

FRENCH 102 y. *French Literature of the Seventeenth Century* (4)—Two lectures. (Wilcox.)

FRENCH 103 y. *French Literature of the Eighteenth Century* (4)—Two lectures. (Not given in 1938-1939.) (Falls.)

FRENCH 104 y. *French Literature of the Nineteenth Century* (4)—Two lectures. (Not given in 1938-1939.) (Wilcox.)

FRENCH 105 y. *French Literature of the Twentieth Century* (4)—Two lectures. (Falls.)

FRENCH 110 y. *Advanced Composition* (6)—Three lectures. Prerequisite, French 10 y. (Falls.)

FRENCH 120. *Conference Course in Reading* (2-4).

This course proposes: (1) to fix the attention of the student upon his field of concentration as a whole rather than upon the detailed knowledge of the subject-matter of such courses as he has taken in the field; (2) to develop in the student the ability to read independently. Conferences with qualified members of the department take the place of formal lectures.

Attention is also called to Comparative Literature 105 f, *Romanticism in France*.

Courses for Graduates

FRENCH 201 y. *Research*. Credits determined by work accomplished.

FRENCH 202 y. *Diderot and the Encyclopaedists* (4)—Two lectures. (Not given in 1938-1939.) (Falls.)

FRENCH 203 y. *Aspects and Conceptions of Nature in French Literature of the Eighteenth Century* (4)—Two lectures. (Not given in 1938-1939.) (Falls.)

FRENCH 204 y. *Georges Duhamel, Poet, Dramatist, Novelist* (4)—Two lectures. (Falls.)

FRENCH 205 y. *French Literature of the Middle Ages and the Renaissance* (4)—Two lectures. (Not given in 1938-1939.) (Darby.)

FRENCH 210 y. *Seminar* (2-4)—One meeting weekly. Required of all graduate students in French.

B. German

Courses for Graduates and Advanced Undergraduates

GERMAN 101 f. *German Literature of the Eighteenth Century* (3)—Three lectures.

The earlier classical literature. (Prah1.)

GERMAN 102 s. *German Literature of the Eighteenth Century* (3)—Three lectures.

The later classical literature. (Prahl.)

GERMAN 103 f. *German Literature of the Nineteenth Century* (3)—Three lectures. (Not given in 1938-1939.)

Romanticism in Young Germany. (Prahl.)

GERMAN 104 s. *German Literature of the Nineteenth Century* (3)—Three lectures. (Not given in 1938-1939.)

The literature of the Empire. (Prahl.)

GERMAN 105 f, 106 s. *Contemporary German Literature* (3-3)—Three lectures. (Not given in 1938-1939.)

A study of the lives, works, and influence of outstanding authors of the present. (Prahl.)

GERMAN 120. *Conference Course in Reading* (2-4.)

This course proposes: (1) to fix the attention of the student upon his field of concentration as a whole rather than upon the detailed knowledge of the subject-matter of such courses as he has taken in the field; (2) to develop in the student the ability to read independently. Conferences with qualified members of the department take the place of formal lectures.

Attention is called to Comparative Literature 106 s, *Romanticism in Germany*, and Comparative Literature 107 f, *The Faust Legend in England and German Literature*.

Courses for Graduates

GERMAN 201 y. *Research*. Credits determined by work accomplished.

GERMAN 202 y. *The Modern German Drama* (4)—Two lectures. (Not given in 1938-1939.)

Study of the naturalistic, neo-romantic, and expressionistic drama against the background of Ibsen and other international figures. (Prahl.)

GERMAN 203 y. *Schiller* (4)—Two lectures.

Study of the life and works of Schiller with special emphasis on the history of his dramas. (Prahl.)

GERMAN 210 y. *Seminar* (2-4)—One meeting weekly. Required of all graduate students in German.

C. Spanish

Courses for Graduates and Advanced Undergraduates

SPANISH 103 f. *The Spanish Drama* (3)—Three lectures. (Not given in 1938-1939.)

The drama of the Golden Age. (Darby.)

SPANISH 104 s. *The Spanish Drama* (3)—Three lectures. (Not given in 1938-1939.)

Continuation of Spanish 103 f. The drama since Calderon. (Darby.)

SPANISH 105 y. *Cervantes* (6)—Three lectures.

Life and times of Cervantes; principal prose works. (Darby.)

SPANISH 107 f. *The Spanish Novel* (3)—Three lectures. (Not given in 1938-1939.)

Somewhat simplified, edited texts of classical novels and short stories of the Golden Age will be used. (Darby.)

SPANISH 108 s. *The Spanish Novel* (3)—Three lectures. (Not given in 1938-1939.)

Continuation of Spanish 107 f. A study of the development of the modern novel. (Darby.)

SPANISH 120. *Conference Course in Reading* (2-4).

This course proposes: (1) to fix the attention of the student upon his field of concentration as a whole rather than upon the detailed knowledge of the subject-matter of such courses as he has taken in the field; (2) to develop in the student the ability to read independently. Conferences with qualified members of the department take the place of formal lectures.

Courses for Graduates

SPANISH 201 y. *Research*. Credits determined by work accomplished.

SPANISH 202 y. *The Golden Age in Spanish Literature* (6)—Three lectures. (Not given in 1938-1939.)

Detailed study of the classical authors. (Darby.)

SPANISH 203 f. *Spanish Poetry* (3)—Three lectures.

The epic, the ballad and popular poetry, early lyrics, poetry of the Golden Age. (Darby.)

SPANISH 204 s. *Spanish Poetry* (3)—Three lectures.

Continuation of Spanish 203 f. Poetry of the 18th, 19th, and 20th centuries. (Darby.)

SPANISH 210 y. *Seminar* (2-4)—One meeting weekly. Required of all graduate students in Spanish.

PHILOSOPHY

Courses for Graduates and Advanced Undergraduates

PHIL. 101 f. *Systems of Philosophy—Kant* (3)—Three hours. Lectures, reports and discussions. Prerequisite, two courses in philosophy, and the permission of the instructor.

The system of one philosopher, or the development of one movement, will be studied throughout the semester. The topic will be changed from semester to semester, although after three or four semesters the same system may be chosen again. (Marti.)

PHIL. 102 s. *Systems of Philosophy—Fichte* (3)—Three hours of lectures, student reports, and discussion. Prerequisite, two courses in philosophy and the permission of the instructor.

Continuation of Phil. 101 f. (Marti.)

PHIL. 103 f. *Systems of Philosophy* (3)—Three hours of lectures, student reports, and discussion. Prerequisite, two courses in philosophy and the permission of the instructor. Continuation of Phil. 101 f. (Not given in 1938-1939.) (Marti.)

PHIL. 104 s. *Systems of Philosophy* (3)—Three hours of lectures, student reports, and discussion. Prerequisite, two courses in philosophy and the permission of the instructor. Continuation of Phil. 101 f. (Not given in 1938-1939.) (Marti.)

PHYSICS

Courses for Graduates and Advanced Undergraduates

PHYS. 101 f. *Precision of Measurements* (3)—Three lectures. Prerequisites, Phys. 1 y or 2 y and Math. 5 y or 6 y.

A discussion of the principles underlying the treatment of experimental data, as to precision of observations, errors, interpolation, curve analysis, etc., with special emphasis on the planning of investigations involving measurements. The course is intended as an introduction to quantitative experimental work. (Eichlin.)

PHYS. 102 s. *Quantitative Physical Measurements* (3)—Two lectures; one laboratory. Prerequisite, Phys. 101 f.

This course, supplementing Phys. 101 f. is designed to familiarize the student with the manipulation of various types of apparatus used in experimentation in physical problems, and the adaptation and analysis of data so obtained. (Eichlin.)

PHYS. 103 y. *Advanced Physics* (6)—Three lectures. Prerequisite, Phys. 1 y.

This course, supplementing Phys. 1 y, is an advanced study of physical phenomena in optics, spectroscopy, conduction of electricity through gases, photoelectricity, etc., with a comprehensive review of basic principles involved. It is intended to familiarize the student in a general survey with some of the recent developments in physics. (Smith.)

PHYS. 104 y. *Advanced Experiments* (6)—One lecture; two laboratories. Prerequisite, Phys. 103 y. (Not given in 1938-1939.)

This course, supplementing Phys. 1 y, is intended to provide the student with experience in experimental physics. (Dickinson.)

PHYS. 105 f. *Heat and Thermodynamics* (3)—Two lectures; one laboratory. Prerequisite, Phys. 2 y.

The classical phenomena of heat and radiation are developed on the basis of the kinetic molecular theory and the quantum theory. The first and second laws of the thermodynamics are applied to physical processes. (Dickinson.)

PHYS. 106 s. *Theoretical Mechanics* (3)—Two lectures; one laboratory. Prerequisite, Phys. 2 y.

An analytical treatment of the fundamental principles of kinematics and dynamics is presented with problems and laboratory exercises to illustrate

these principles. The use of generalized coördinates is illustrated. The equations of Lagrange are applied to selected topics in the field of dynamics. (Dickinson.)

PHYS. 107 f. *Optics* (3)—Two lectures; one laboratory. Prerequisite, Phys. 2 y.

A study is made of selected topics in the refraction, reflection, interference, diffraction and polarization of light. The principles are employed on a detailed study of optical systems of telescope, microscope, spectroscope and interferometer. (Dickinson.)

PHYS. 108 s. *Electricity and Magnetism* (3)—Two lectures; one laboratory. Prerequisite, Phys. 2 y.

A study is made of elementary and mathematical theory of electrostatics, magnetostatics, magnetism, electrical currents, etc.

An experimental study of electrical instruments and their use in physical measurements is included. (Dickinson.)

PHYS. 109 y. *Electric Discharge* (6)—Two lectures; one laboratory. Prerequisites, at least two courses of the 105 f-108 s group.

The discrete nature of matter, electricity and radiation is emphasized from an empirical point of view. The determination of the fundamental electronic and molecular constants is treated in detail. The process of electrical discharge through gas and vacuum is ramified to include discussion of radioactivity, photoelectricity, thermionics and atomic structure.

Courses for Graduates

PHYS. 201 f. *Atomic Structure* (3)—Three lectures.

Development of theories on the structure of the atom through discussion of optical and X-ray spectra, atomic models as applied to the periodic table, and related topics. (Eichlin.)

PHYS. 202 s. *Advanced Spectroscopy* (3)—Three lectures. Prerequisite, 201 f.

A continuation of Physics 201 f. (Eichlin.)

PHYS. 203 f. *Quantum Theory* (3)—Three lectures.

Discussion of the application of the principles of the quantum theory to black body radiation, spectroscopy, collision processes, valence, etc.

(Eichlin.)

PHYS. 204 s. *Nuclear Physics* (3)—Three lectures.

Discussion of the constitution of the nucleus, natural radioactivity disintegration processes, neutron, positron, nuclear energy states, artificial disintegration, etc.

(Eichlin.)

PHYS. 205 f and 206 s. *Fundamental Concepts of Modern Physics* (6)—Three lectures. (Not given in 1938-1939.)

Comprehensive surveys of the history of physics; the electromagnetic theory of radiation; interaction of radiation and matter; introduction to the quantum mechanics.

PHYS. 207 f. *Electrodynamics* (3)—Three lectures. (Not given in 1938-1939.)

A mathematical study of electrostatics and electromagnetics with application to diffraction, dispersion, electro- and magneto-optics.

PHYS. 208 s. *Physical Optics* (3)—Three lectures. (Not given in 1938-1939.)

A mathematical study of the electromagnetic theory of light with applications to interference, diffraction, dispersion, polarization.

PHYS. 209 y. *Seminar* (2).

Presentation of reports and discussion of current developments in physics and of original investigations on special problems. (Staff.)

PHYS. 210 y. *Research*.

The investigation of special problems in physics. (Staff.)

POLITICAL SCIENCE

Courses for Graduates and Advanced Undergraduates

POL. SCI. 101 f. *International Relations* (3)—Three lectures. Prerequisite, Pol. Sci. 1 f or s, or consent of instructor. (Not given in 1938-1939.)

The course deals with the major factors underlying international relations; the influence of geography, climate, nationalism, imperialism, etc. (Steinmeyer.)

POL. SCI. 102 s. *International Law* (3)—Three lectures. Prerequisite, Pol. Sci. 1 f or s.

A study of the principles governing international intercourse in time of peace and war, as illustrated in text and cases. (Steinmeyer.)

POL. SCI. 103 f. *International Organization* (3)—Three lectures. Prerequisite, Pol. Sci. 1 f or s, or consent of instructor.

The course deals with the forms and functions of the various co-operative international organizations, with special reference to the League of Nations and the Permanent Court of International Justice. (Steinmeyer.)

POL. SCI. 104 s. *Recent Far Eastern Politics* (3)—Three lectures. Prerequisite, Pol. Sci. 1 f or s, or consent of instructor.

The background and interpretation of recent political events in the Far East and their influence on world politics. (Steinmeyer.)

POL. SCI. 105 f. *Problems of World Politics* (3)—Three lectures. Prerequisite, Pol. Sci. 1 f or s, or consent of instructor.

The course deals with governmental problems of an international character, such as causes of war, problems of neutrality, propaganda, etc. Students are required to report on readings from current literature. (Steinmeyer.)

POL. SCI. 106 s. *British Empire* (3)—Three lectures. Prerequisite, Pol. Sci. 7 f. (Not given in 1938-1939.)

A survey of the constitutional development of the British Dominions with particular attention to the present inter-imperial relationship. (Steinmeyer.)

POL. SCI. 111 f. *Principles of Public Administration* (3)—Three lectures. Prerequisite, Pol. Sci. 4 f or s.

A functional study of public administration in the United States with special emphasis upon organization and the relation of administration to the other branches of government. (Howard.)

POL. SCI. 112 s. *Problems of Public Administration* (3)—Three lectures. Prerequisite, Pol. Sci. 4 f or s.

A detailed study of selected current problems in the field of national and state government with particular emphasis upon their administrative aspects. (Howard.)

POL. SCI. 113 f. *Public Personnel Administration* (3)—Three lectures. Prerequisite, Pol. Sci. 111 f. or consent of instructor. (Not given in 1938-39.)

A study of public personnel practices in the various jurisdictions of the United States and their comparison with practices in certain European countries. (Howard.)

POL. SCI. 114 s. *Municipal Government and Administration* (3)—Three lectures. Prerequisite, Pol. Sci. 4 f or s.

A detailed study of selected problems of municipal government such as housing, health, zoning, fire and police, recreation and planning. Course includes a visit to Baltimore to observe the agencies of city government at work. (Bone.)

POL. SCI. 121 f. *Political Parties and Public Opinion* (3)—Three lectures. Prerequisite, Pol. Sci. 1 f or s.

A descriptive and critical examination of the party process in government; nominations and elections, party expenditures, political leadership, the management and conditioning of public opinion. (Bone.)

POL. SCI. 123 f. *Government and Business* (3)—Three lectures. Prerequisite, Pol. Sci. 1 f or s.

A general survey of governmental activities affecting business with special emphasis upon recent developments; federal and state assistance to, and regulation of business in their historical and legal aspects; government ownership and operation. (Bone.)

POL. SCI. 124 s. *Legislatures and Legislation* (3)—Three lectures. Prerequisite, Pol. Sci. 4 f or s.

A comprehensive study of the legislative process, bi-cameralism, the committee system and the lobby, with special emphasis upon the legislature of Maryland. The course includes a visit to Washington to observe Congress at work. (Bone.)

POL. SCI. 125 f. *Constitutional Law* (3)—Three lectures. Prerequisite, Pol. Sci. 1 f or s.

A study of constitutional law in the United States as interpreted by the Supreme Court. Special attention is given to the American federal system, the amending clause, and the powers of President, Congress and courts. (Lasson.)

POL. SCI. 128 s. *Administrative Law* (3)—Three lectures. Prerequisite, Pol. Sci. 1 f or s.

A study of the powers and procedure of administrative bodies; the validity of administrative regulations and the conclusiveness of administrative decisions. (Howard.)

POL. SCI. 131 f. *History of Political Theory* (3)—Three lectures. Prerequisite, Pol. Sci. 1 f or s, or consent of instructor.

A survey of the principal political theories set forth in the world of writers from Plato to Bentham.

POL. SCI. 132 s. *Recent Political Theory* (3)—Three lectures. Prerequisite, Pol. Sci. 1 f or s, or consent of instructor.

A study of recent political ideas with special emphasis upon theories of democracy, socialism, communism, Fascism, etc.

Courses for Graduates

POL. SCI. 201 f or s. *Research in Political Science* (2-4)—Credit apportioned according to work accomplished. (Staff.)

POL. SCI. 203 y. *Seminar in Federal-State Relations* (4)—Reports on topics assigned for individual research in the field of recent federal-state relations. (Howard.)

POL. SCI. 205 y. *Seminar in Public Opinion* (4)—Reports on topics assigned for individual research in both the national and international aspects of public opinion and propaganda. (Staff.)

POULTRY HUSBANDRY

Courses for Graduates and Advanced Undergraduates

POULTRY 101 s. *Poultry Genetics* (3)—Three lectures, demonstration, quizz periods. Prerequisites, Poultry 2 f and Gen. 111 f.

The inheritance of morphological and physiological characters of poultry will be presented. Inheritance of factors related to egg and meat production and quality will be stressed.

POULTRY 102 f. *Poultry Nutrition* (2)—One lecture, one two-hour laboratory, demonstration, quizz. Prerequisite, Poultry 1 f and 1 s.

The nutritive requirements of poultry and the nutrients which meet those requirements will be presented. Feed cost of poultry production will be emphasized.

POULTRY 104 y. *Poultry Products* (4)—Two lectures, demonstration, quizz periods. Prerequisite, Poultry 1 f and 1 s.

This course will include material on egg and meat quality, commercial grades, relation of transportation and distribution to quality, and methods of marketing, especially as related to quality.

POULTRY 106 f. *Poultry Physiology* (1 or 2)—One lecture, one two-hour laboratory. Prerequisite, Poultry 102 s.

The physiology of development and incubation of the embryo, especially physiological pathology of the embryo in relation to hatchability, will be presented. Physiology of growth and the influence of environmental factors on growth and development will be considered.

POULTRY 107 y. *Poultry Industrial and Economic Problems* (4)—Two lectures.

This course will present the relation of poultry to agriculture as a whole and its economic importance. Consumer prejudices and preferences, production, transportation, storage, and distribution problems will be discussed. Trends in the industry, surpluses and their utilization, poultry by-products, and disease problems, will be presented.

POULTRY 109 f and s. *Poultry Literature* (2-8).

Readings on individual topics will be assigned. Oral and written reports will be required. Methods of analysis and presentation of scientific material will be taught.

Courses for Graduates

POULTRY 201 f. *Advanced Poultry Genetics* (3)—Three lectures. Prerequisite, Poultry 102 s or equivalent.

This course will serve as a foundation for research in poultry genetics. Linkage, crossing-over, inheritance of sex, the expression of genes in development, inheritance of resistance to disease and the influence of the environment on the expression of genetic capacities will be considered.

POULTRY 202 f. *Advanced Poultry Nutrition* (3)—Two lectures, one laboratory. Prerequisite, Poultry 102 f or equivalent.

Deficiency diseases of poultry will be considered intensively. Vitamin, mineral and protein deficiencies will be given special consideration. Synthetic diets, metabolism and the physiology of digestion, growth curves and their significance, and feed efficiency in growth and egg production will be studied.

POULTRY 203 s. *Physiology of Reproduction of Poultry* (3)—Two lectures, one two-hour laboratory.

The role of the endocrines in reproduction, especially with respect to egg production, will be considered. Fertility, sexual maturity, broodiness, molting, egg formation, ovulation, deposition of egg envelopes and the physiology of oviposition will be studied.

POULTRY 204 y. Seminar (2).

Reports of current researches by staff members, graduate students and guest speakers will be presented.

POULTRY 205 y. *Research*.

Research with poultry may be conducted under the supervision of staff members toward the requirements for advanced degrees.

PSYCHOLOGY

Courses for Graduates and Advanced Undergraduates

PSYCH 110 f or s. *Advanced Educational Psychology* (3)—Two lectures and one discussion. Prerequisite, Psych. 10.

Advanced treatment of the solution of basic psychological problems in education by methods of controlled observation. (Sprawls.)

PSYCH. 120 f. *Psychology of Individual Differences* (3)—Two lectures and one discussion. Prerequisite, Psych. 1 f or s.

The occurrence, nature, and causes of psychological differences between individuals; methods of measuring these differences. (Clark.)

PSYCH. 121 s. *Experimental Social Psychology* (3)—Two lectures and one discussion. Prerequisite, Psych. 120 f.

Results of researches on behavior in social settings; experimental studies of the effects of group membership, of the family, and of current social forces. (Jenkins.)

PSYCH. 125 f. *Child Psychology* (3)—Two lectures and one discussion. Prerequisite, Psych. 1 f or s.

Experimental and statistical analyses of child behavior and of the early stages of human development.

PSYCH. 130 f or s. *Mental Hygiene* (3)—Two lectures and one clinic. Prerequisite, Psych. 1 f or s. Repeated in second semester.

The more common deviations of personality; typical methods of adjustment. (Sprowls, Hall.)

PSYCH. 131 s. *Abnormal Psychology* (3)—Two lectures and one clinic. Prerequisite, Psych. 130 f or s.

The nature, occurrence and causes of psychological abnormality with emphasis on the clinical rather than theoretical aspects. (Sprowls, Hall.)

PSYCH. 140 f. *Psychological Problems in Market Research* (3)—Two lectures and one discussion. Prerequisite, Psych. 121 s.

Use of methods of controlled observation in determining public reactions to merchandise and in measuring the psychological influences at work in particular markets. (Jenkins.)

PSYCH. 141 s. *Psychology in Advertising and Selling* (3)—Two lectures and one discussion. Prerequisite, Psych. 121 s.

Experimental and statistical studies of psychological aspects of advertising including attention, memory, comprehension and motivation. (Ghiselli.)

PSYCH. 150 s. *Psychological Tests and Measurements* (3)—Two lectures and one laboratory period. Prerequisite, Psych. 120 f.

Survey of typical psychological tests used in vocational orientation and in industry; actual practice in administering such tests.

PSYCH. 160 f. *Psychological Aspects of Industrial Production* (3)—Two lectures and one discussion. Prerequisite, Psych. 121 s.

Controlled observation applied to psychological problems in industrial production, including psychological effects of conditions and methods of work. (Ghiselli.)

PSYCH. 161 s. *Psychology of Personnel* (3)—Two lectures and one discussion. Prerequisite, Psych. 121 s.

Typical problems and methods of approach to psychological problems involved in vocational orientation, employee morale, and employee motivation. (Clark.)

PSYCH. 190 y. *Techniques of Investigation in Psychology* (3)—Three periods of practice and discussion. Prerequisite, Psych. 150 s.

Actual practice in various methods of obtaining data and in treating these results for interpretation. Required of all majors. (Ghiselli.)

Courses for Graduates

PSYCH. 200 y. *Research in Psychotechnology* (4-6)—Credit apportioned to work accomplished. (Staff.)

PSYCH. 210 y. *Seminar in Educational Psychology* (6)—An advanced course for teachers and prospective teachers.

Systematic approach to advanced problems in educational psychology based upon specific experimental contributions. (Sprowlis.)

PSYCH. 240 y. *Seminar in Current Psychotechnological Problems* (6)—As advanced course for students pursuing major graduate studies.

A systematic analysis of recent contributions in selected psychotechnological fields. (Jenkins, Clark.)

PSYCH. 250 y. *Participation in Testing Clinic* (4-6)—Credit apportioned to work accomplished.

Actual practice in the administration and interpretation of psychological tests in the course of the routine operation of the testing clinic. (Ghiselli.)

SOCIOLOGY

Courses for Graduates and Advanced Undergraduates

Soc. 101 f. *Rural Sociology* (2)—Two lectures. Graduate students will be required to prepare an extra term paper.

The structure and functions of rural communities, ancient and modern; the evolution of rural culture; rural institutions and their problems; the psychology of rural life; composition and characteristics of rural population; relation of rural life to the major social processes; the social aspects of rural planning. (Dodson.)

Soc. 102 s. *Urban Sociology* (2)—Two lectures. Graduate students will be required to prepare an extra term paper.

The origin and growth of cities; composition and characteristics of city populations; the nature and significance of urbanization; the social structure and functions of the city; urban personalities and groups; cultural conflicts arising out of the impact of the urban environment. (Joslyn.)

Soc. 103 f. *Criminology and Penology* (3)—Three lectures. Prerequisite, Soc. Sci. 1 y or Soc. 1.

The nature, extent, and cost of crime. Causative factors. Historical methods of dealing with criminals. Apprehension of alleged criminals. The machinery of justice. Penal institutions. Other means of caring for convicted persons. The prevention of crime. (Jacobi.)

Soc. 104 s. *Social Psychology* (3)—Three discussions.

The development of human nature and personality as products of social

experience and interaction; the behavior of public audiences, groups, crowds, and mobs; the development and functioning of such psychosocial forces as imitation, styles, fads, leadership, public opinion, propaganda, nationalism, etc. (Manny.)

Soc. 105 f. *Social Organization* (2)—Two lectures. Prerequisite, Soc. 1 f.

Social groupings above the family in size as found among primitives and modern civilization, including neighborhoods, communities, special interest organizations, etc.; leadership and fellowship in organization activities; interorganizational conflict and co-operation. (Joslyn.)

Soc. 107 s. *Social Pathology* (3)—Three lectures. Prerequisite, Soc. 1 f. or consent of instructor.

Causative factors and social complications in individual and group pathological conditions; historic methods of dealing with the dependent, defective, and delinquent classes. (Joslyn.)

Soc. 109 f. *Introduction to Social Work* (3)—Three lectures. Prerequisite, Soc. 107 s or consent of instructor.

Brief historical review of the evolution of social work. Present-day types of social work, institutional treatment, public and private agencies; the theory and technique of social case work; recent development arising out of the depression; visits to representative social agencies. This course is intended primarily for persons intending to take advanced professional training in this field. (Joslyn.)

Soc. 110 s. *The Family* (2)—Two lectures. Prerequisite, Soc. 1 f.

Anthropological and historical backgrounds; biological, economic, psychological, and sociological bases of the family; the role of the family in personality development; family and society; family disorganization; family adjustment and social change. (Jacobi.)

Soc. 111 f. *Recent Social Thought* (2)—Two lectures. Prerequisites, Soc. 1 f. and consent of instructor. Intended mainly for sociology majors and minors. (Not offered in 1938-1939.)

Critical study of the leading schools of sociological thought in various countries since 1900. (Joslyn.)

Soc. 113 f. *Dynamics of Population* (2)—Two lectures. Prerequisites, Soc. 1 f and Gen. 111 f or consent of instructor.

Causes of population growth and decline; major population migrations; population pressure and international problems; eugenic factors; statistical analyses of population trends in the United States. (Joslyn.)

Soc. 115 f. *The Village* (2)—Two lectures. An extra term paper will be required of graduate students. (Not offered in 1938-1939.)

The evolution of the American village; present day social structure and functions of the village; an analysis of village population; the relationship of the village to urban and open-country areas; village planning. (Manny.)

Soc. 117 f. *The Sociology of Leisure* (2)—Two lectures. Prerequisite,

Soc. 1 f or s. An extra term paper will be required of each graduate student.

This course deals with the sociological implications of leisure time and its uses, particularly in contemporary American life. The group aspects of recreation, including both commercialized and voluntary forms, community organization and planning for leisure-time activities, and related subjects, are included. (Manny.)

Courses for Graduates

Soc. 201 f or s. *Sociological Research* (2-4)—Credit proportional to work accomplished.

Individual research projects involving either field work or analysis of compiled data. (Staff.)

Soc. 202 f or s. *Seminar in Sociological Theories* (2).

Assigned topics for discussion dealing primarily with major sociological theories and problems. Designed for major students in the Department of Sociology. (Staff.)

SOCIAL WORK

NOTE: The following courses are offered in Baltimore under the joint auspices of the University of Maryland and the Baltimore Council of Social Agencies. Until further notice, enrollment in these courses is restricted to currently employed personnel of Maryland social agencies and constitutes part of the "in-service" training program of these agencies. To obtain graduate credit from the University of Maryland, students must meet all requirements for admission to the Graduate School of the University. For further details, see special circular.

SOCIAL WORK 201 f or s. *Introduction to Social Casework I* (2)—Two lectures.

A discussion of case material to give the student a general introduction to the basic processes of social casework with special emphasis on the individual and his social situation.

SOCIAL WORK 202 s. *Social Casework II* (2)—Two lectures. Prerequisite, Social Work 201 or a similar introductory casework course.

A further analytical study of casework methods.

SOCIAL WORK 205 s. *Diagnosis as a Part of Casework Treatment* (2)—Two lectures. Prerequisite, completion of one year's work in graduate school of social work, or its equivalent.

Case material illustrating various types of treatment will be used. Emphasis will be placed upon a study of the early period in treatment so that the student may develop an ability to establish and to understand the relationship with the client, to bring out and evaluate material important for diagnosis, and to meet the real and psychological needs of the client which must be met prior to diagnosis. (Halloway.)

SOCIAL WORK 220 f or s. *A Dynamic Approach to the Problems of Human Behavior* (2)—Two lectures.

The course includes such topics as behavior, its motivation, factors modifying behavior, the structure of the personality and of the psyche, the

modification of the personality in various development phases, the evidence of maladjustment and an effort to relate maladjustments to experiences and personality patterns. Special reference will be made to the implications of the foregoing for social work in its theory and practice. (Hill.)

SOCIAL WORK 221 f. *Social Psychiatric Treatment* (2)—Two lectures. Prerequisite, Social Work 220 f or s, or its full equivalent.

Lectures and discussions of cases showing the application of psychiatry to social casework. (Hill.)

SOCIAL WORK 230 f and s. *Medical Problems in Social Work* (2)—Two lectures.

This course will attempt to give the social worker a general understanding of various medical problems, especially concerning chronic diseases, nutrition, tuberculosis, heart disease, syphilis. The course will be given in two semesters covering different conditions in each semester.

(Wilkins. ———.)

SOCIAL WORK 250 s. *Public Welfare Administration* (2)—Two lectures. Open to senior workers, supervisors, and executives who have had some formal training in social work.

The history, function, organization, and administration of local, state, and federal public welfare associations.

SOCIAL WORK 270 f. *Labor Problems* (2)—Two lectures.

This course deals with the rise and development of the American labor movement. Treatment is given to the development of trade unionism in this country, with a brief comparison of the problems and objectives of American organized labor with those of labor groups in certain European countries. Special attention is given to wage rates, hours of labor, conditions of work, collective bargaining and labor disputes. Legislation enacted to meet the problems of insecurity affecting labor, as well as to develop collective bargaining, will be treated in some detail. In this latter connection, consideration will be given to relief legislation, public works programs, the Social Security Act, and the National Labor Relations Act.

(Clague.)

ZOOLOGY

Courses for Graduates and Advanced Undergraduates

Zool. 101 f and s. *Mammalian Anatomy* (6)—Three laboratories. Registration limited. Permission of the instructor must be obtained before registration.

A course in the dissection of the cat or other mammal. Recommended for premedical students, and those whose major is zoology. (Hard.)

Zool. 103 f and s. *General Animal Physiology* (6)—Two lectures; one laboratory. Prerequisites, one year of chemistry and one course in vertebrate anatomy. Registration limited to twelve, and permission of instructor must be obtained before registration.

The first semester work deals with the fundamentals of cellular and general physiology; the second semester is devoted to an application of these principles to the higher animals. (Phillips.)

ZOOL. 105 y. *Aquiculture* (4)—One lecture; one laboratory. Prerequisite, one course in zoology.

The course deals with the practices employed in rearing aquatic animals and the properties of natural waters which render them suitable for environmental purposes. (Truitt.)

ZOOL. 106 y. *Journal Club* (2)—One session.

Reviews, reports, and discussions of current literature. Required of all students whose major is zoology. (Staff.)

ZOOL. 108 f. *Animal Geography* (3)—Two lectures; one laboratory. Prerequisite, one course in zoology.

This course deals with the distribution, classification, and environmental relations of animals. Several field trips are scheduled. (Newcombe.)

ZOOL. 120 s. *Animal Genetics* (3)—Two lectures; one laboratory. Permission of the instructor must be obtained before registration.

The fundamental principles of heredity and variation. While primarily of interest to students of biology, this course is of value to those interested in the humanities. Required of students whose major is zoology who do not have credit for Gen. 101 f. (Burhoe.)

ZOOL. 121 s. *Animal Ecology* (3)—One lecture; two laboratories. Prerequisite, one course in zoology.

Animals are studied in relation to their natural surroundings. Certain environmental factors affecting growth, behavior and distribution are analyzed by observations and experiments conducted in the field and also in the laboratory under controlled conditions. Special field excursions are made to the mountains and sea shore. (Newcombe.)

Courses for Graduates

ZOOL. 200 y. *Marine Zoology* (6)—One lecture; two laboratories. Problems in salt water animal life of the higher phyla. (Truitt.)

ZOOL. 201 y. *Microscopical Anatomy of Vertebrates* (6)—One lecture; two laboratories.

A detailed study of the morphology and activity of cells composing vertebrate tissues. Recent advances in the field of cytology are covered in lectures, assigned readings and reports. Opportunity is given for individual research. (Hard.)

ZOOL. 203 y. *Advanced Embryology* (6)—One lecture; two laboratories.

Mechanics of fertilization and growth. A review of the important contributions in the field of experimental embryology and development of animals. Opportunity is given for individual research. (Burhoe.)

ZOOL. 204 y. *Advanced Animal Physiology* (6)—One lecture; two laboratories.

The principles of general and cellular physiology as found in animal life. (Phillips.)

ZOOL. 205 y. *Biology of Marine Organisms* (6)—One lecture; two laboratories.

Biotic, physical, and chemical factors of the marine environment, including certain fundamental principles of oceanography. Special reference is made to the Chesapeake Bay region. (Newcombe.)

ZOOL. 206 y. *Research*—Credit to be arranged.

(Staff.)

CHESAPEAKE BIOLOGICAL LABORATORY

This laboratory, located in the center of the Chesapeake Bay country, is on Solomons Island, Maryland. It is sponsored cooperatively by the Maryland Conservation Department, Goucher College, Washington College, Johns Hopkins University, University of Maryland, Western Maryland College, and the Carnegie Institution of Washington, in order to afford a center for wild life research and study where facts tending toward a fuller appreciation of nature may be gathered and disseminated. The program projects a comprehensive survey of the biota of the Chesapeake region.

The laboratory is open from June until September, inclusive; and during the summer of 1938 courses will be offered in the following subjects: Algae, Economic Zoology, Diatoms, Protozoology, Ichthyology, Invertebrate Zoology.

These courses, of three credit hours each, are for advanced undergraduates and graduates. They cover a period of six weeks. Not more than two courses may be taken by a student, who must meet the requirements of the Department of Zoology as well as those of the Laboratory before matriculation. Each class is limited to five matriculants. Students working on special research problems may establish residence for the entire summer period.

Laboratory facilities, boats of various types fully equipped (pumps, nets, dredges, and other apparatus), and collecting devices are available for the work without extra cost to the student.

For full information consult special announcement, which may be obtained by applying to R. V. Truitt, Director, College Park, Maryland.

GRADUATE COURSES IN THE PROFESSIONAL SCHOOLS AT
BALTIMORE
SCHOOL OF MEDICINE

ANATOMY

Minors

The courses recorded under "Minors" are acceptable as graduate courses only if they are taken to satisfy minor requirements in a major subject.

ANAT. 101 f. *Human Gross Anatomy* (10)—Total number of hours 288. Five lectures; fifteen laboratory hours per week throughout the first semester.

A complete dissection of the human body (exclusive of the central nervous system.)

(Uhlenhuth, Figge, Siwinski, Covington, Lipsett.)

ANAT. 102 f. *Mammalian Histology* (6)—Two lectures; ten laboratory hours per week.

A general survey of the histological structure of the organs of mammals and man. Opportunity is offered for examining and studying a complete collection of microscopical sections. (Davis, Lutz.)

ANAT. 103 s. *Human Neurology* (4)—Two lectures and four laboratory hours per week for thirteen weeks of the first semester. Prerequisite, Anat. 102 or equivalent.

This course provides a general survey of the structure of the human central nervous system, being mainly directed toward the fiber tracts and nuclei contained therein. It includes a brief study of the special senses. The laboratory work is based on a dissection of the human brain, together with the study of prepared microscopic sections of the brain stem.

(Davis, Lutz.)

Majors

ANAT. 202 f and s. *For work leading to a Ph. D. in Anatomy.*

A study of the neurological problems based on 103 s. Only students who have had the preceding course in neurology are eligible for this work.

(Davis.)

Courses 203, 204 and 205 are offered throughout the year, including the summer time. Time and credit are adjusted in personal conference between student and instructor.

ANAT. 203. *Advanced Gross Anatomy.* Total number of hours, approximately 150. Monday, Tuesday, Wednesday, 2-5 p. m.

The study of human anatomy by gross anatomical methods, especially by dissection of specialized structures and limited regions of the human body. The exact nature of this course will depend on the requirements of the applicant. It may be taken by students of anatomy, medicine and biology as well as by physicians desiring graduate work.

(Uhlenhuth, Figge, Lipsett.)

ANAT. 204. *Experimental Anatomy of the Endocrine Glands.*

This course is intended to impart broad familiarity with the subject and to provide, through the medium of laboratory work, a knowledge of the methods of its investigation. Intimate contact with the instructor, frequent informal discussions and properly selected reading take the place of formal lectures. (Uhlenhuth.)

ANAT. 205. *Problems in the Experimental Anatomy of the Endocrines.*

This course is a continuation of the previous one, but on an advanced level. It may be used conveniently for the preparation of a Doctor's thesis and leads to a Ph.D. degree. (Uhlenhuth.)

BACTERIOLOGY

Minors

BACT. 101 f. Sixteen lectures and 104 laboratory hours (5).

The course includes the preparation and sterilization of culture media and the study of pathogenic bacteria and the more important protozoa. The principles of general bacteriology are discussed in lectures.

BACT. 102 s. Sixteen lectures and 56 laboratory hours (4).

Principles of immunology are discussed in the lectures. Experiments to demonstrate the action of various antibodies are performed by the students.

Majors

BACT. 201. Time and credit are subject to special arrangement. A laboratory course on selected problems of bacteriology. The lectures are supplemented by personal contact with the instructor, discussions of the various phases of the work and by reading.

BACT. 202. *Research.* Time and credit are subject to special arrangement.

BIOCHEMISTRY

Minors

BIOCHEM. 101 s. *Fundamental Principles of Biochemistry* (6)—Six lectures and conferences, and two three-hour laboratory periods per week for sixteen weeks, from February to May, inclusive.

This course is designed to present the fundamental principles of biological chemistry and to indicate their applications to the clinical aspects of medicine. The phenomena of living matter and its chief ingredients, secretions and excretions, are discussed in lectures and conferences and examined experimentally. Training is given in routine biochemical methods of investigation. This course is a prerequisite to advanced work in this subject. Graduate students who take this course as a minor toward a higher degree are required to supplement it by extra-curricular work.

(Wylie, Schmidt, Ogden.)

Majors

BIOCHEM. 201 f and s. A course in specialized fields of biochemistry designed to prepare the student for advanced research work. Prerequisite, Biochem. 101 s. The particular phases of biochemistry taken up in this course will vary with the requirements and interests of the student. The course is limited to students working toward a Ph.D. degree in biochemistry and in other biological subjects. Credit is allotted in keeping with the extent and quality of work accomplished. (Wylie, Schmidt.)

BIOCHEM. 202 f and s. *Research*. Limited to graduate students seeking a Ph.D. degree in biochemistry. Credit is given on the basis of extent and quality of accomplishment. (Wylie, Schmidt.)

PHARMACOLOGY

All students majoring in pharmacology with a view to obtaining the degree of Master of Science or Doctor of Philosophy should secure special training in anatomy, mammalian physiology, organic chemistry, and physical chemistry (Chem. 102A y).

Minors

PHARMACOLOGY 101 f and s. *General Pharmacology* (7)—Three lectures; one laboratory. This course consists of 75 lectures and 30 laboratory periods of three hours each; offered each year, September to May inclusive, at the Medical School.

Pharmacology as applied to medicine and the fundamental principles of pharmacologic technique are taught in this course, hence it is a prerequisite for all other advanced courses in this subject.

(Krantz, Carr, Evans, Musser, Harne, Johnson.)

Majors

PHARMACOLOGY 202 f. *Chemotherapy*. Credit in accordance with the amount of work accomplished.

The action of new synthetic compounds from a pharmacodynamic point of view. (Krantz.)

PHARMACOLOGY 203 f. *Carbohydrate Metabolism*. Credit in accordance with the amount of work accomplished.

A systematic study of the relationship between chemical constitution and the fate of carbohydrates and carbohydrate-like substances in the animal body. (Krantz and Carr.)

PHARMACOLOGY 204 f. *Research*. Credit in accordance with the amount of work accomplished.

Properly guided research problems in pharmacology and related fields. Open to students majoring in pharmacology. (Krantz, Carr.)

PHYSIOLOGY

Minors

PHYSIOLOGY 101. *The Principles of Physiology* (8)—Three lectures and two laboratory periods a week, supplemented by conferences and demonstrations, February to May, inclusive.

The fundamental concepts of physiology are presented in lectures and illustrated by laboratory experiments. Attention is given especially to those phases of physiology which are essential for a medical training.

(Amberson and Staff.)

Majors

PHYSIOLOGY 201. *Experimental Mammalian Physiology*. Time and credit by arrangement.

Open to properly qualified graduate students. The work will consist of selected experiments and discussions involving the original literature.

(Amberson, Smith, Oster.)

PHYSIOLOGY 202. *Physiological Effects of Radiation* (1). Weekly lectures and conferences during November and December. Open only to students with an adequate training in physics. A thesis will be required.

The purpose is to review the general principles and problems concerned in the use of radiation in medicine.

(Oster.)

PHYSIOLOGY 203. *Physiology of the Endocrines* (1). Weekly lectures, October to January, inclusive, on recent developments in endocrinology.

(Smith.)

PHYSIOLOGY 204. Seminar. Credit according to work done.

Intensive study of the literature in selected fields of physiology as a preparation for research.

(Amberson and Staff.)

PHYSIOLOGY 205. *Research*. By arrangement with the head of the department.

(Staff.)

SCHOOL OF PHARMACY

BOTANY

Courses for Graduates and Advanced Undergraduates

BOT. 101 y. *Taxonomy of the Higher Plants* (4)—One lecture; one laboratory.

A study of the kinds of seed plants and ferns, their classification, and field work on local flora. Emphasis will be placed on official drug plants. Instruction will be given in the preparation of an herbarium. (Slama.)

BOT. 102 y. *Advanced Vegetable Histology* (8)—Two lectures; two laboratories.

Work covers advanced plant anatomy, embedding of material in celloidin and in paraffin, section cutting, etc., leading to research. (Slama.)

Courses for Graduates

BOT. 201 y. *Advanced Study of Vegetable Powders* (8)—Two lectures; two laboratories.

A study of powdered vegetable drugs and spices from the structural and micro-chemical standpoints, including practice in identification and the detection of adulterants. (Slama.)

BOT. 202 y. *Advanced Taxonomy of Vascular Plants*. Credit dependent on work done. Prerequisite, Bot. 101 y. (Slama.)

BOT. 203 y. *Research in Pharmacognosy*. Credit according to amount and quality of work performed.

PHARMACEUTICAL CHEMISTRY

Courses for Graduates and Advanced Undergraduates

PHAR. CHEM. 101 f. *Chemistry of Medicinal Products* (3-5)—Two lectures; one to three laboratory periods.

A study of the more important medicinal plant products and of synthetic compounds. The laboratory work will include the isolation and identification of plant principles and the preparation of the simpler organic compounds used in medicine. (Hartung.)

PHAR. CHEM. 101 s. *Food Chemistry* (4)—Two lectures; two laboratory periods.

A study of the composition of foods, their adulterants, and the methods employed by public health and industrial laboratories for the analytical examination of foods. (Hartung.)

PHAR. CHEM. 105 y. *Advanced Pharmaceutical Analysis* (3-6)—Three laboratory periods. The course may be elected for either or both semesters, and may be taken by undergraduates with the consent of the professor in charge.

A laboratory study of the qualitative and quantitative analytical procedures and methods as applied to official and commercial, natural and synthetic drugs, their intermediates and derivatives. (Hartung.)

Courses for Graduates

PHAR. CHEM. 200 y. *Survey of Pharmaceutical Chemistry*. Credit and hours to be arranged.

A survey of the chemical structure and reaction of selected groups of pharmaceutically and pharmacologically important compounds of non-basic nature. (Hartung, Starkey.)

PHAR. CHEM. 201 y. *Chemistry of Alkaloids* (4)—Two lectures. (Not given in 1938-1939.)

A survey of the chemical structure and the reactions of pharmaceutically and pharmacologically important organic bases. (Hartung.)

PHAR. CHEM. 202 y. *Advanced Pharmaceutical Synthesis* (1-8)—Laboratory work and conferences.

A study of fundamental and basic chemical procedures employed in the synthesis of various drugs and their intermediates, and a survey of their application. (Hartung.)

PHAR. CHEM. 203 y. *Pharmaceutical Chemistry Seminar* (2).

Reports of progress and discussion of the problems encountered in research and the presentation of papers which survey the recent developments of pharmaceutical chemistry reported in the current literature. Required of all students majoring in the department throughout their period of matriculation. (Hartung.)

PHAR. CHEM. 204 y. *History of Pharmaceutical Chemistry* (2-4)—One lecture and assigned reading. (Not given in 1938-1939.)

A study of the development of pharmaceutical chemistry in relation to the history of other sciences, industry and civilization. (Hartung.)

PHAR. CHEM. 205 y. *Research in Pharmaceutical Chemistry*. Credit to be determined by the amount and the quality of the work performed. (Hartung.)

PHARMACOLOGY AND THERAPEUTICS

Courses for Graduates and Advanced Undergraduates

PHARMACOLOGY 101 f. *Physiological Assaying and Testing* (4)—Two lectures, two laboratories. Prerequisite, Physiology 1 f and Pharmacology 1 y.

A course in physiological drug assaying with special reference to the methods of the United States Pharmacopoeia and National Formulary. (Thompson.)

Courses for Graduates

PHARMACOLOGY 201 y. *Advanced Physiological Assaying and Testing* (8)—Two lectures; two laboratories. Prerequisite, Pharmacology 101 f.

A study of modern unofficial methods of physiological assaying applied to the evaluation of medicinal substances. (Thompson.)

PHARMACOLOGY 202 y. *Special Studies in Pharmacodynamics* (2-4)—Two lectures; two laboratories. Prerequisite, Pharmacology 101 f.

The procedures involved in pharmacological analysis and in the determination of the site of action and the nature of action of drugs.
(Thompson.)

PHARMACOLOGY 203 y. *Physiological Assay Methods* (4-8)—Two lectures; two laboratories. Prerequisite, Pharmacology 101 f.

The development of physiological assay methods for drugs for which no satisfactory chemical or physiological methods are known, involving both library and experimental studies.
(Thompson.)

PHARMACOLOGY 204 y. *Research in Pharmacology and Therapeutics*. Credit according to amount and quality of work performed. (Thompson.)

PHARMACY

Courses for Graduates and Advanced Undergraduates

PHARMACY 101 y. (6)—One lecture; two laboratories. Prerequisite, consent of the instructor.

A continuation of the courses given in the pharmacy school in the second and third years with special reference to methods employed in the manufacture of pharmaceuticals on a commercial scale.
(DuMez.)

Courses for Graduates

PHARMACY 201 y. *Advanced Pharmaceutical Technology* (8)—Two lectures; two laboratories.

A study of pharmaceutical manufacturing processes from the standpoint of plants, crude materials used, their collection, preservation, and transformation into forms suitable for therapeutic use.
(DuMez.)

PHARMACY 202 y. *Survey of Pharmaceutical Literature*. Credit according to the work performed.

Lectures and topics on the literature pertaining to pharmacy with special reference to the origin and development of the works on drug standards; pharmaceutical periodicals.
(DuMez.)

PHARMACY 203 y. *History of Pharmacy* (4)—Two lectures.

Lectures and topics on the development of pharmacy in America and in the principal countries of Europe.
(DuMez.)

PHARMACY 204 y. *Research in Pharmacy*. Credit and hours to be arranged.
(DuMez.)

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